FINAL SITE INSPECTION REPORT

CPG KICKOUT AREA

LOUISIANA ARMY NATIONAL GUARD
CAMP MINDEN, LOUISIANA

JUNE 2014

Prepared for:

United States Army Corps of Engineers, Fort Worth District
Fort Worth, Texas

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ACRONYMS AND ABBREVIATIONS

^{o}F	degrees Fahrenheit
amsl	above mean sea level
AOI	area of interest
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHE	Chemical Hazard Evaluation
COC	chemical of concern
COPECs	contaminant of potential ecological concern
CPG	Central Proving Grounds
CWM	Chemical Warfare Material
DERP	Defense Environmental Restoration Program
DID	Data Item Description
DMM	discarded military munitions
DoD	Department of Defense
DDESB	DoD Explosive Safety Board
e^2M	Engineering-Environmental Management
EE/CA	engineering evaluation/cost analysis
EHE	Explosive Hazard Evaluation
ELAP	Environmental Lab Accreditation Program
ft	feet
FUDS	formerly used defense site
GPS	global positioning system
HHE	Health Hazard Evaluation
HI	hazard index
HMX	cyclotetramethylenetetranitramine
HRR	historical records review
IC	institutional controls
IRP	Installation Restoration Program
LAAP	Louisiana Army Ammunition Plant
LAARNG	Louisiana Army National Guard
LDEQ	Louisiana Department of Environmental Quality
LTM	long term monitoring
LUC	land use controls
MC	munitions constituents
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
mm	millimeter
MMRP	Military Munitions Response Program
MNA	monitored natural attenuation
MPPEH	material potentially presenting an explosive hazard

ACRONYMS AND ABBREVIATIONS (CONTINUED)

MRS	Munitions Response Site
NFA	no further action
OB/OD	open burn / open detonation
OU	Operable Unit
QC	quality control
RDX	cyclotrimethylenetrinitramine
RECAP	Risk Evaluation / Corrective Action Program
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RSL	Regional Screening Level
SAP	semi-armor piercing
SEE	Stell Environmental Enterprises, Inc.
SI	Site Inspection
TAL	Target Analyte List
tetryl	lN-methyl-N-2,4,6-tetranitroaniline
TNT	2,4,6-trinitrotoluene
TPP	Technical Project Planning
U.S.	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance
WAAS	Wide Area Augmentation System
WWII	World War II

EXECUTIVE SUMMARY

Congress established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program (DERP) to address unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) located on current and formerly used defense sites (FUDS). MMRP eligible sites include areas other than operational ranges where UXO, DMM, or MC are known or suspected and the release occurred prior to September 30, 2002. The objective of this effort was to assess hazards posed by munitions and explosives of concern (MEC) at the Central Proving Grounds (CPG) Kickout Area in compliance with these requirements.

Site Inspection and Scope

The overall objective of the MMRP Site Inspection (SI) was to determine whether this FUDS site warrants further response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The SI collects the minimum amount of information necessary to make this determination. The SI also: (1) determines the potential need for a removal action; (2) collects or develops additional data, as appropriate, for Hazard Ranking System scoring by the United States (U.S.) Environmental Protection Agency (USEPA); and (3) collects data, as appropriate, to characterize environmental impact to the site, if present, for effective and rapid initiation of a Remedial Investigation and Feasibility Study (RI/FS).

The specific objective of this SI was to determine if MEC exists at the CPG Kickout Area Munitions Response Site (MRS) and to determine if MC contamination related to former Department of Defense (DoD) operations is present in shallow soil. The SI was conducted in accordance with CERCLA and the National Oil and Hazardous Substances Contingency Plan. The technical approach for this SI was based on the Camp Minden SI Work Plan (SEE, 2013) and Data Item Description (DID) MMRP-09-0001.

Site Inspection Summary

The CPG Kickout Area was investigated from January 14 through January 15, 2014, by a field team consisting of three UXO technicians and two field support staff.

The CPG Kickout Area is an approximate 4.4 acre parcel located on the north perimeter of the previously assessed MMRP CPG site. The Kickout Area is heavily forested with secondary growth loblolly pine and lesser amounts of miscellaneous hardwoods.

During a 2011 site visit conducted by the Louisiana Army National Guard (LAARNG), ordnance was observed scattered over the surface area within the Kickout Area. The parcel was noted to have shrapnel and detonated ordinance on the surface. Of concern is the potential presence of UXO extending beyond the fenced boundary of the Kickout Area. While Camp Minden in general has controlled access, the site is periodically open to hunters, and the potential for trespassers is also present. During the SI activities, it was noted that the condition of the fence surrounding the Kickout Area is questionable, as fallen trees have compromised the integrity of the fence. According to LAARNG personnel, the current land use for the site is commercial and there are currently no short term or long terms plans for use or reuse of the site that would require digging or human trespass.

The field team completed a geophysical survey consisting of 32 north/south transects and 6 east/west transects totaling approximately 2.4 miles within the CPG Kickout Area. Transect

paths wavered slightly to significantly during execution of geophysical activities to the presence of heavy vegetation. Furthermore, transects were extended beyond the fence line due to the continued presence of anomaly detection. An additional 2.45 acres of land located north of the fence was also surveyed. A total of approximately 6.75 acres was surveyed. The strong presence of MEC was identified during the survey based on magnetic anomalies and visual evidence. Two hundred twenty-three (223) anomalies were detected throughout the CPG Kick-out Area, with 77 anomalies recorded as multiple responses. During the field survey, MEC and material potentially presenting an explosive hazard (MPPEH) were readily present throughout the surveyed area. Several of the MEC that were identified contained a yellow substance believed to be N-methyl-N-2,4,6-tetranitroaniline (tetryl), which would be consistent with soil analytical results. MEC visually observed were identified primarily as fuzes and projectile bodies.

Sampling included the collection of surface soil from areas where MEC was identified based on the visual survey of the CPG Kickout Area. Ten soil samples were collected to characterize MC in shallow soil. The samples were collected from soil within 6 inches of the ground surface at biased locations. Collected environmental samples were tested for the following:

- Target Analyte List (TAL) metals using USEPA SW846 test methods 6020A, 6010C, and 7471B;
- Perchlorate using USEPA SW846 test method 6860; and
- Explosives, including tetryl, cyclotrimethylenetrinitramine (RDX), 2,4,6-trinitrotoluene (TNT), and cyclotetramethylenetetranitramine (HMX), using USEPA SW846 test method 8330A.

Soil Analysis Results

Soil analytical results indicated trace level detections of explosives related chemicals of concern for three compounds. Three samples contained detections of tetryl and five samples contained detections of perchlorate above the laboratory method detection limit. The explosive compound 1,2-dinitrobenzene was reported in each of the soils samples ranging from 2.4 to 2.7 milligrams per kilogram (mg/kg). These are known explosive compounds used to make detonators and explosive booster charges. Tetryl is a nitramine booster explosive and is a predecessor of RDX. Tetryl is typically mixed with mercury fulminate and potassium chlorate to ensure detonation of tetryl. None of the concentrations of explosives reported exceeds the RECAP industrial soil screening standards or the EPA Region 6 Industrial Soil RSLs.

Results from the soil TAL metals analysis indicated that several of the TAL metals were present at elevated levels within the surface soil samples. With the exception of arsenic in sample CM-01, which exceeds the RECAP industrial soil screening standard of 12 mg/kg, none of the remaining metal concentrations were greater than the RECAP industrial screening level for soil. There are no published RECAP industrial soil screening standards for iron and mercury; therefore the concentrations of iron and mercury were compared to the EPA Region 6 Industrial Soil RSLs. Iron concentrations in sample CM-01 and CM-02 were detected above the EPA Region 6 Industrial Soil RSL of 72,000 mg/kg. Mercury was detected in each sample collected, with concentrations in samples CM-01, CM-04, CM-05, CM-06, CM-08, CM-09, and CM-10 above the EPA Region 6 Industrial Soil RSL of 4.3 mg/kg.

Eleven surface soil samples were collected at the CPG during the 1996 and 2002 soil sampling investigations. A summary of the metals results from those investigations is presented in Appendix C. The soil analytical results appear from the 1996 and 2002 investigations are consistent with the mercury concentrations reported as part of this SI. The arsenic and iron concentrations in samples from this SI were not consistent with previous data collected at the CPG. Arsenic concentrations from the previous investigations ranged from 0.443 mg/kg to 4.17 mg/kg while concentrations from this SI ranged from 2.1 mg/kg to 14 mg/kg. Iron concentrations from the previous investigations ranged from 7,500 mg/kg to 33,700 mg/kg while concentrations from this SI ranged from 4,800 mg/kg to 81,000 mg/kg.

MRSPP Scoring

MRSPP scoring sheets for the munitions response sites (MRS) identified in this SI Report are included in Appendix A. Much of the Explosive Hazard Evaluation (EHE) module is prepared from existing information and knowledge of the site's history and its surrounding environments. Based on this history, the potential for Chemical Warfare Material (CWM) at Camp Minden is considered to not likely be present. Limited site specific data was obtained to assess the Health Hazard Evaluation (HHE) Module. While site-wide groundwater controls and restrictions are in place at Camp Minden, further evaluation is pending to fully characterize the human and ecological hazards.

Recommendations

Based on the chemical data obtained to date and the number of potential MEC/MPPEH still present on site, further surface and subsurface sampling is recommended to better address human and ecological risks. An RI/FS is required based on the identified presence and distribution of MEC at the site. It is recommended that the LAARNG assess the nature and extent of the MEC and MC as part of the RI. Immediate actions are recommended to expand and repair the current fence surrounding the site and use of land use restrictions to control access should continue. The initial area of interest (AOI) should also be expanded by approximate 2.45 acres beyond the current barbed-wire fence to include the area where anomalies were detected as part of this SI field investigation.

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1.0 INTRODUCTION

This Site Inspection (SI) Report presents the results of the SI activities conducted at the Central Proving Grounds (CPG) Kickout Area at the Louisiana Army National Guard (LAARNG) facility located at Camp Minden, Doyline, Louisiana. Camp Minden is also known as the former Louisiana Army Ammunition Plant (LAAP) that was originally acquired by the United States (U.S.) Government in 1941 for the purpose of ammunition production. The facility operated periodically until 1993 when production of ammunition was terminated and the facility officially put on standby status. The U.S. Army conveyed the property to the State of Louisiana in 2004 provided that at least 13,500 acres of property are used for military training. In 2005, the remaining 1,449 acres retained by the Army were transferred to the LAARNG and the LAAP was renamed Camp Minden.

1.1 PROJECT AUTHORIZATION

Stell Environmental Enterprises, Inc. (SEE) was contracted by the U.S. Army Corps of Engineers (USACE) to perform a Military Munitions Response Program (MMRP) SI at two Munitions Response Sites (MRS) at the LAARNG, Camp Minden, located in Doyline, Louisiana (Figure 1-1). This work is being performed under Contract No. W9126G-13-P-0171. The Draft SI Report for Test Area T-7 was submitted under a separate cover.

1.2 PURPOSE, SCOPE, AND OBJECTIVES OF THE SITE INVESTIGATION

Congress established the MMRP under the Defense Environmental Restoration Program (DERP) to address unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) located on current and formerly used defense sites (FUDS). MMRP eligible sites include areas other than operational ranges where UXO, DMM, or MC are known or suspected and the release occurred prior to September 30, 2002.

The objective of the SI was to determine if munitions and explosives of concern (MEC) exist and to determine if MC contamination related to former Department of Defense (DoD) operations exists at the CPG Kickout Area. The CPG Kickout Area is located adjacent to the CPG Area in the northwestern section of Camp Minden (Figure 1-2). The SI was conducted in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the National Oil and Hazardous Substances Contingency Plan. The technical approach for this SI was based on the Camp Minden SI Work Plan (SEE, 2013) and Data Item Description (DID) MMRP-09-0001.

1.3 MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL

The Munitions Response Site Prioritization Protocol was published as a rule on October 5, 2005 (70 FR 58028). This rule implements the requirement established in section 311(b) of the National Defense Authorization Act for Fiscal Year 2002 for the DoD to assign a relative priority for munitions responses to each location in the DoD's inventory of defense sites known or suspected of containing unexploded ordnance (UXO), discarded military munitions, or MC (70 FR 58016).

MRSPP scoring sheets for the munitions response sites (MRSs) identified in this SI Report are included in Appendix A. The MRSPP scoring will be updated on an annual basis to incorporate new information.

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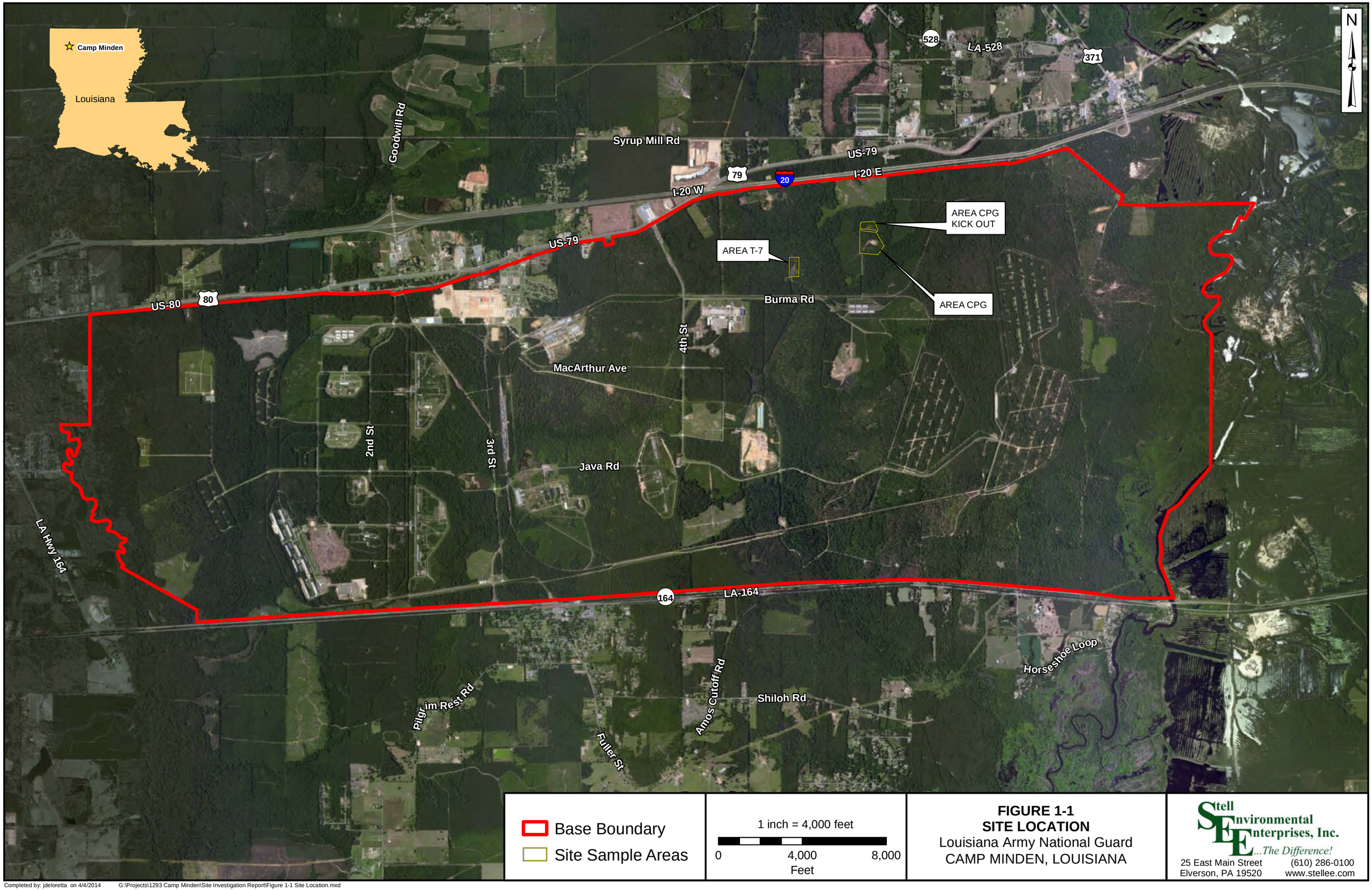

FIGURE 1-1
SITE LOCATION
Louisiana Army National Guard
CAMP MINDEN, LOUISIANA

Stellee Environmental Enterprises, Inc.
...The Difference!
25 East Main Street
Elverson, PA 19520
(610) 286-0100
www.stellee.com

Completed by: jdeloretta on 4/4/2014 G:\Projects\1293 Camp Minden\Site Investigation Report\Figure 1-1 Site Location.mxd

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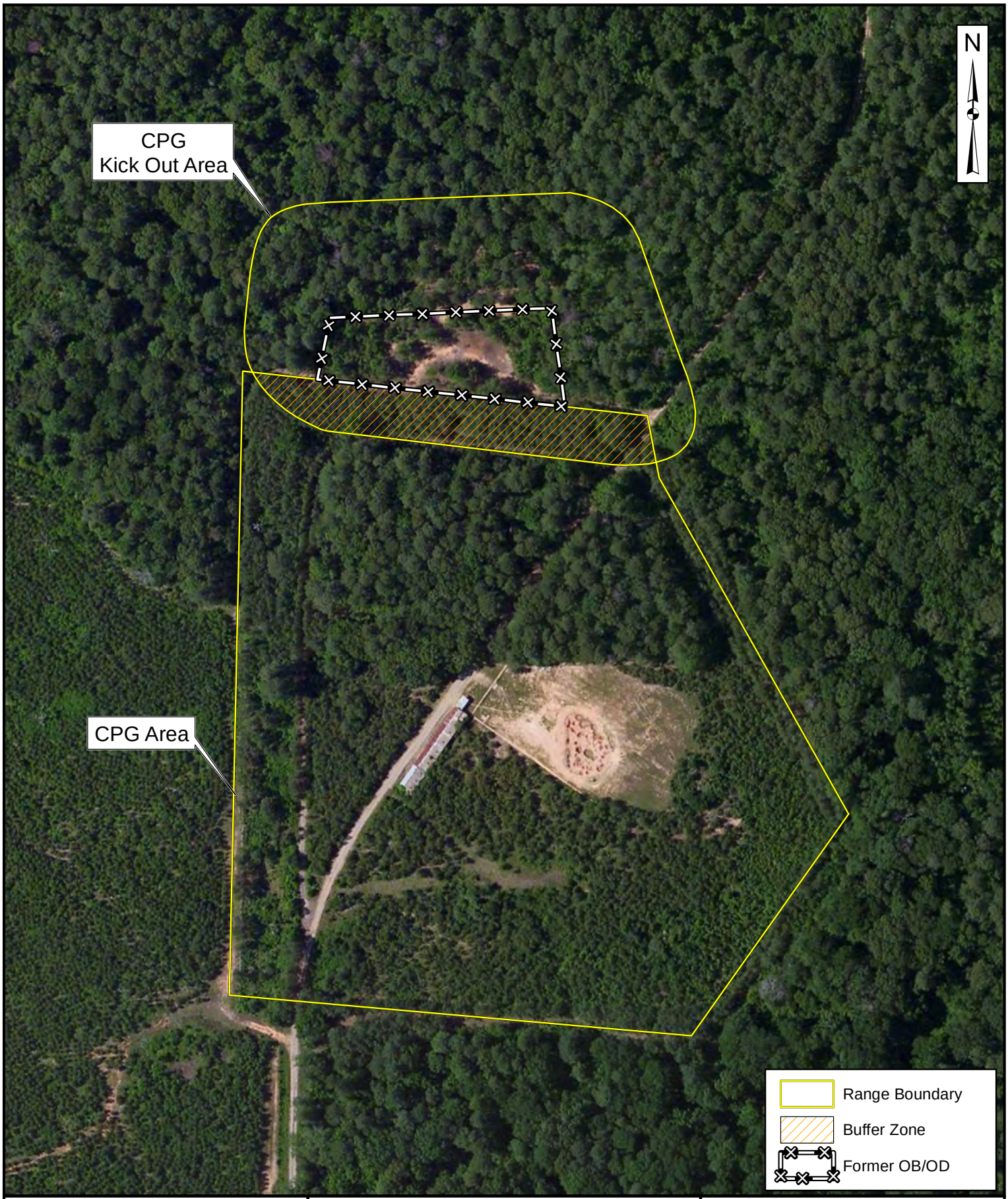

1 inch = 200 feet

0 100 200 300 400 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 1-2
CPG and CPG Kickout Area
Louisiana Army National Guard
CAMP MINDEN, LOUISIANA

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Completed by: jdeloretta on 4/4/2014 G:\Projects\1293 Camp Minden\Site Investigation Report\CPG\Figure 1-2 CPG and CPG Kickout Area.mxd

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2.0 PROPERTY DESRCIPTION AND HISTORY

The setting, history, and use of Camp Minden are described in the following sections.

2.1 PROJECT LOCATION AND DESCRIPTION

Camp Minden is located approximately 22 miles east of Shreveport, Louisiana on State Route 80, and consists of approximately 15,010 acres. The former LAAP commercial property occupies 1,284 acres and contains 703 buildings. There are approximately 13,219 acres of operational range area at Camp Minden. The operational range area, which consists of 18 ranges, is currently used by the LAARNG to provide tactical training for Army National Guard troops (Shaw, 2006). The LAARNG uses the property to train and house soldiers. Many former areas are leased to various tenants for the production of flares, ammunition, mine boosters, black powder, and to demilitarize munitions. The non-operational area is composed of 27 small parcels scattered throughout the west-central portion of the installation. Current training at Camp Minden includes both non-live-fire and live-fire activities. Non-live-fire activities are conducted within Camp Minden's two small arms ranges that are located in the eastern half of the installation. In addition to current ammunitions use, portions of Camp Minden were historically utilized for the production and testing of medium and large caliber munitions (Shaw, 2006).

2.2 NEARBY POPULATION

2.2.1 CENTER OF ACTIVITY

Camp Minden is located in portions of Bossier and Webster Parishes, Louisiana.

2.2.2 POPULATION DENSITY

The population densities for the parishes associated with Camp Minden are as follows:

Table 2-1: Parish Population Density

Parish	Area (square miles)	Population	Population Density (persons/square mile)
Bossier	840.06	116,979	139.3
Webster	593.03	41,207	69.5

Source: U.S. Census Bureau, 2010

The cities of Shreveport and Bossier City are located approximately 22 miles west of LAAP and the town of Minden is located about two miles northeast of LAAP. Haughton is located within two miles of the western boundary of LAAP. The community of Doyline is located on U.S. Highway 164 at the installation's southern boundary and the community of Goodwill is located on U.S. Highway 80 at the installation's northern boundary (Shaw, 2006).

2.3 SITE HISTORY

2.3.1 HISTORIC LAND USE

Camp Minden was initially developed as the LAAP in 1941 when the U.S. government acquired the land. The Silas Mason Company was contracted to build the LAAP for the production of ammunition, mines, grenades, and fuzes to use during World War II (WWII). Eight ammunition production lines were initially constructed at the facility by May 1942. An ammonium nitrate graining plant was added to the production capabilities near the end of WWII. Sixty-five different items of ammunition were produced at the LAAP during WWI. Ammunition production ceased in August 1945 at the conclusion of WWII. The federal government released

Silas Mason Company from responsibility for the plant in November 1945 and placed the facility in standby status.

Remington Rand, Inc. reactivated the installation under a government contract in February 1951 to produce ammunition for the Korean Conflict. The LAAP produced antitank mines, antipersonnel mines, fuzes, boosters, and conventional projectiles ranging in size from 57 millimeters (mm) to 155 mm during the Korean Conflict. Employment at the facility peaked at over 5,000 employees in 1953. Production was suspended in February 1958 and the LAAP was again placed in standby status.

Sperry Rand, Inc. reopened LAAP in September 1961 and began production of ammunition for the Vietnam Conflict. Items that were produced included 2.75-inch warheads, 4.2-inch mortars, and 155 mm projectiles.

The contract was transferred from the Sperry Rand Corporation to the Thiokol Corporation in 1975. From 1975 to 1989, production included M692, 4.2-inch mortars; M107 B, M73 grenade assemblies; 2.75-inch warheads; guided missile high explosives; 155 mm metal parts switched from M483 to M864; M825 smoke; and M687 binary items. Thiokol Corporation stopped ammunition production in 1994 and Valentec, Inc. was issued the contract in 1997 (Shaw, 2006).

2.3.2 CURRENT LAND USE

Legislation was enacted in 2004 to convey the LAAP property from the Army to the State of Louisiana, provided the majority of the property is used for military training and the remaining property is used for commercial or industrial activities. LAAP was transferred to the State of Louisiana in January 2005 and renamed Camp Minden. The State of Louisiana Military Department accepted the property on behalf of the State of Louisiana. The State of Louisiana assumed the rights and responsibilities of the Army under the Armaments Retooling Manufacturing Support agreement between the Army and the installation use contractor. Even though the property has been transferred to the state, all environmental remediation responsibilities remained with the Army until 2007 (LAAP, 2007).

Camp Minden is currently divided into two areas consisting of military training property and commercial property. The military training property has no inhabited buildings and primarily consists of undeveloped woodland and wetlands, bunkers, burning grounds, and test areas. The commercial property includes the administration area, general storage and maintenance areas, load/assemble/pack line storage facilities, and the sewage treatment plant. The CPG Kickout Area is located within the portion of the site designated for commercial use.

2.4 CPG KICKOUT AREA SITE DESCRIPTION

The CPG, also known as the Central Test Area, is located in the northeastern portion of the former LAAP installation and was used from the early 1950s until the early 1990s for testing, detonation, and burning of munitions. The CPG area proper occupies approximately 21 acres. The northernmost section of the CPG was used for demolition purposes. The CPG Kickout Area is located at the northernmost extent of the CPG area and comprises an area of approximately 4.3 acres. It is surrounded by a barbed-wire fence line. This area was likely associated with burning operations conducted on raised berms. The area in the middle that overlaps both areas served as a buffer zone used to house two-day storage magazines (i.e., to hold donor material), an administrative work shop, and a saw house building. Ordnance was observed scattered over the ground surface within the Kickout Area during 2011 site visits conducted by LAARNG. UXO

that was estimated to be a 4.25 inch mortar round was discovered under vegetative cover along the southeast boundary of the CPG area during a September 2013 fence line survey. The mortar round was removed from the site by an Explosive Ordnance Disposal unit out of Fort Polk, Louisiana.

Examples of potential material destroyed and tested associated with the CPG area include:

- M16 mine, AP M14 Mine, AP activator, M2;
- BLU-3 A/B bomb;
- AP adaptor booster
- M904 bomb fuze;
- M905 bomb fuze;
- Primers for 57 millimeter (mm) projectiles, detonators for fuzes;
- M427 fuze for 2.75 warhead; and
- M423 fuze for 2.75 warhead.

Although records (i.e., daily logs) could not be located that identified the volume and exact types of munitions destroyed at the burning ground, the Applied Services and Information Systems Remediation Project Manager personally recovered spent fuzes (e.g., four 57 mm rounds) and spent WWII era 37 mm semi-armor piercing (SAP) rounds that were historically buried and have since migrated to the surface at the site.

2.5 TOPOGRAPHY

The Camp Minden property includes three major landform types: dissected uplands in the east, slightly rolling low land in the west, and the ancient Red River floodplain through the central portion of the installation. The elevation varies from 145 feet (ft) above mean sea level (amsl) near Bayou Dorcheat in the east to 225 ft amsl in the central portion of the installation to 180 ft amsl at Clarke Bayou in the west.

The elevation at the center of the CPG Kickout Area is 203 ft amsl. The topography of the site is primarily level except in areas where eroded as a result of surface drainage to the tributaries of the Red River (URS Corporation [URS], 2010).

2.6 CLIMATE AND VEGETATION

The climate of northwest Louisiana is classified as subtropical-humid and continental with hot summers and cool winters. The prevailing southerly winds during the summer provide a moist subtropical climate; however, the pressure distribution occasionally results in westerly or northerly winds and hot, dry weather. The area is alternatively subject to moist subtropical air and dry, cold air during the winter that sometimes results in extreme temperature changes (Dougherty Spraque Environmental, Inc. [DSE] 2005).

The average temperature during the summer is 81 degrees Fahrenheit (ºF). August is the hottest month with an average temperature of 83ºF. The average temperature during the winter is 47ºF. January is the coldest month with an average temperature of 45ºF. Temperatures of 90ºF or higher occur an average of 103 days each year. Temperatures of 32ºF or lower occur an average

of 43 days per year. The relative humidity is 60 percent or higher more than 280 days per year and is 40 percent or lower less than 26 days per year (DSE, 2005).

The average annual rainfall at Minden, Louisiana, is approximately 55 inches. Monthly rainfall averages approximately five inches during autumn and winter and approximately four inches during spring and summer. The wettest months are November and January; the least amount of rain falls during August and September. During winter, over 98 percent of precipitation is rain; an average of only two inches of snow (0.2 inches of precipitation) falls per year. The evaporation rate is approximately 39 inches per year. A storm event that statistically occurs only once every 25 years theoretically produces 12.44 inches of rain within 24 hours (DSE, 2005).

2.7 GEOLOGY AND SOILS

The geology of Camp Minden is made up of continental and marine deposits that filled the Gulf basin. The geologic units underlying the site from the surface to about 1,000 ft consist of unconsolidated sediments ranging in age from Eocene to Pleistocene. Pleistocene terrace deposits cover the entire surface of LAAP. The terrace sediments are floodplain and river deposits from the ancestral Red River that generally grade from clays and silts at the surface to sand and gravel at the bottom (SA, 2000). The Terrace deposits are divided into the Upper Terrace and Lower Terrace sands (URS, 2010). These river deposits can vary laterally over short distances, which may help to explain the limited movement of contaminants in groundwater. The river deposits are horizontal and overlie the Eocene deposits that dip to the northeast and form an angular unconformity between the Pleistocene and Eocene deposits (SA, 2000).

The youngest Eocene age unit is the Sparta Formation that subcrops on the northeastern portion of the site. It is a major source of groundwater for the city of Minden to the northeast, but is not a well-developed aquifer on Camp Minden. The Eocene age Cane River Formation subcrops in the central portion of Camp Minden and is a marine shale. It acts as a confining layer and prevents the vertical flow of groundwater and contaminants. The terrace deposits on the western end of the Camp Minden overlie the Wilcox Formation, which is a non-marine shale with some sand and lignite. It is estimated that only 20 to 30 percent of the Wilcox Formation is sand. Camp Minden's water supply is from wells installed in the sandy portions of the Wilcox Formation (SA, 2000).

The shallow deposits at LAAP typically consist of unconsolidated Pleistocene basal sand and gravel that grade upward to silts and clays. The U.S. Department of Agriculture (USDA), Soil Survey of Webster Parish, Louisiana indicates that there are four major soil series at LAAP which are as follows: Kolin silt loam, Wrightsville silt loam, Guyton-Quachita silt loam, and the Gore silt loam. The Kolin, Wrightsville, and Gore complexes are characterized as upland soil types. At the CPG Kickout Area there are two predominant soil series, The Kolin silty loams, which consist of deep, moderately well drained, slowly permeable, acidic soils and the Wrightsville silty loams, which consist of very deep, poorly drained, very slowly permeable soils (USDA, 2014).

2.8 HYDROGEOLOGY

The hydrology of Camp Minden is composed of several aquifers and confining units and includes the Wilcox Sand Aquifer, Cane River Aquitard, Sparta Sand Aquifer, and the Pleistocene Terrace Deposits/Holocene Alluvium Aquifer. The Wilcox Aquifer can be further divided into three distinct aquifers, each with different hydraulic characteristics, called the Lower

Wilcox, Middle Wilcox, and Upper Wilcox-Carizzo Aquifers. The systems are described below in ascending order.

The Upper Wilcox and overlying Carizzo Sand Formation of the Claiborne Group are hydraulically connected, have similar hydrogeologic characteristics, and are considered one hydrologic unit. Recharge comes from precipitation along outcrops and infiltration from the overlying alluvium. Locally, the aquifer is the primary source of drinking water for the Camp Minden and the nearby communities of Doyline and Goodwill. Groundwater flow direction in the aquifer has been altered by the withdrawal of water and the injection of oil field brines into the deeper zone of the unit. The flow direction was historically to the east prior to the development of groundwater resources in the area. The current groundwater flow direction is considered radially from offsite towards the LAAP facility's nine supply wells located west of the main gate to Camp Minden.

The Cane River Formation is an extensive regional aquitard that hydraulically separates the underlying Upper Wilcox-Carizzo Aquifer from the overlying Sparta Sand Aquifer. The Sparta Sand Aquifer is equally extensive and considered a regional aquifer that serves as the primary source of drinking water to the areas east and northeast of Camp Minden. Groundwater flow in the aquifer is believed to be to the northeast. Recharge to the Sparta Sand Aquifer occurs mainly through infiltration of precipitation at outcrop areas and infiltration of the overlying terrace alluvium.

The Pleistocene terrace deposits and younger Holocene alluvium are hydraulically connected and typically behave as one unit. This aquifer is also connected to surface water bodies, where present, and to a lesser degree with underlying aquifers. Recharge is from infiltration of precipitation and associated with leakage from underlying aquifers.

At Camp Minden, the three aquifers have been grouped into two groundwater systems referred to as the shallow and the deep groundwater systems. The shallow groundwater system includes the Pleistocene terrace deposits, younger Holocene alluvium, and the Sparta Sands, which are hydraulically separated from the deep groundwater by the clays, silts, and shale of the Cane River Formation. Within the shallow groundwater, a further division has historically been made separating the upper Terrace Aquifer and the lower Terrace/Sparta Sand Aquifer (e^2M, 2005).

2.9 SURFACE WATER HYDROLOGY

LAAP is located in the Red River Basin. All surface water within LAAP leaves the facility by two bayous and two creeks. Clark Bayou forms the western boundary of LAAP and Bayou Dorcheat forms the eastern boundary. Caney Creek drains the western portions of LAAP into Clark Bayou. Boone Creek and its tributaries drain the eastern and central portions of LAAP and flows into Bayou Dorcheat. A man-made unnamed ditch system that drains the western portions of the facility discharges into Clarke Bayou near the southern LAAP boundary. All of the waterways discharge into Lake Bistineau located approximately 11 miles southeast of LAAP (Shaw, 2007).

2.10 PREVIOUS INVESTIGATIONS FOR MC AND MEC

Previous investigation efforts at CPG concluded that activities conducted at the CPG Area have contributed to the contamination of soil and the underlying upper groundwater with MC and other chemicals of concern (COC); however, these environmental issues are being addressed under the Installation Restoration Program (IRP) and not under the MMRP. The U.S.

Environmental Protection Agency (USEPA) also indicated during a Technical Project Planning (TPP) on December 6, 2006, that the CPG Area was included in the Record of Decision (ROD) as Operable Unit (OU) four (OU-4) for soil contamination, including MC, and consequently did not warrant further remedial efforts.

The historical records review (HRR) performed as part of the TPP identified the MRS as potentially containing MEC and the site was recommended for further investigation through a SI under the MMRP. A considerable amount of munitions debris and potential MEC was found at the MRS during the MMRP HHR and was documented in the SI Report completed for the LAAAP by Engineering-Environmental Management (e^2M) 2005 field work. Subsequent to the SI, the CPG was included in an MMRP Remedial Investigation/Feasibility Study (RI/FS).

Arsenic, iron, and mercury have been identified in the surface and subsurface soil at CPG. The human health risk assessment indicated no unacceptable risks for these three metals under an industrial use scenario. The expanded ecological risk assessment indicated that no remedial action was necessary for the protection of ecological receptors. Therefore, the selected remedy for soils at the CPG was no further action (NFA) with a deed restriction stating that the State will continue to use the majority of the LAAP property for military training and the remaining property for commercial/industrial activities (Shaw, 2006a).

Due to the widespread impact to groundwater associated with previous activities at Camp Minden, the groundwater beneath 20 distinct areas has been rolled into one ROD OU that constitutes OU-5. These areas include:

- BG-5
- BG-8
- Y-Line/OWL
- LF-3
- Area B
- LAAP Line C,D,E,F,G,H,J,K, and S
- Test Areas T-6 and T-7
- CPG Area
- M-3
- DA-9

The results of the site-wide groundwater assessment identified nine areas requiring a response action. These nine areas are Area P, BG-5, BG-8, Y-Line/OWL, Area B, and LAP Line E, F, G, and H. Carcinogenic risks and non-carcinogenic hazards exceeded acceptable levels at each of the nine areas; therefore, it was determined that contamination of the shallow groundwater at the former LAAP would be addressed in accordance with the state's risk-based clean-up program. The selected remedy for OU-5 is monitored natural attenuation (MNA) / long term monitoring (LTM) with institutional controls (IC) including land use control (LUC) restrictions for industrial and/or military land use and deed restrictions that prohibit the use of shallow groundwater. Since this selected remedy does not allow for the unrestricted use of groundwater, a statutory review is required to be conducted within five years after initiation of the remedial action to ensure that the remedy is or will be protective of human health and the environment.

3.0 FIELD WORK

The CPG Kickout Area was investigated on January 14 and January 15, 2014, by a field team consisting of three UXO technicians and two field support staff.

3.1 GEOPHYSICAL INVESTIGATION PLAN

An analog magnetometer-assisted site reconnaissance (analog geophysics) along semi-fixed transects was performed to assess the presence or absence of MEC at the CPG Kickout Area. The transects ran in a north to south direction through most of the area with transects running east to west within a small fenced area within the CPG Kickout Area. The north to south transects generally extended from immediately inside the southern property boundary to approximately 75 feet north of the northern property boundary as metallic anomalies were detected beyond the barbed wire fence boundary. The transects are depicted on Figure 3-1. The geo-survey team walked around any heavy, thick, or impenetrable vegetation that was within the transects' path while continuing to gather information. The survey team used a machete to clear vegetation as needed to traverse small sections of the transects.

A Schonstedt GA-52cx Magnetic Locator was used to characterize potential MEC distribution and locate potential burial pits, disposal pits, or trenches containing metal or metallic debris in the investigation area. Transects were surveyed using a Wide Area Augmentation System (WAAS) Global Positioning System (GPS), Trimble GeoExplorer Series unit.

The five-man field survey crew performed the subsurface analog metal detection survey in real time. UXO crews consisting of one UXO Technician I and two UXO Technician IIIs, meeting the requirements listed in the DoD Explosive Safety Board (DDESB) Technical Paper 18, detected and mapped anomaly locations along the transect paths. Thirty-two transect lines were pre-programmed into the Trimble GPS unit. Pre-programming of the transect lines was useful in guiding field crews along transects due to the heavy vegetation and tree cover present throughout the CPG Kickout Area to ensure that the site was thoroughly investigated. In cases where the transect line could not be directly followed due to heavy vegetation coverage that could not easily be cleared, the field team diverted around the vegetation and returned to the original transect line when the vegetation was cleared to allow access. The location of detected anomalies was logged using the Trimble GPS unit with sub-foot accuracy. The geographical location and observations were collected in the field and logged into the Trimble GPS unit as notes associated with the GPS locations. The Trimble GPS unit required at least four to five satellites to plot each geographical location with sub-foot accuracy. In cases where the satellite coverage was interrupted due to tree canopy cover, a handheld Magellan eXplorist series GPS unit was used to collect anomaly data with a slightly lower accuracy of ten feet; the Magellan unit only required three satellites to function.

The survey team covered a three- to five-foot wide path along the proposed transect while surveying with handheld geophysical instruments and tallied the number of anomalies along each transect segment. The survey team recorded the number of anomalies along each transect with the GPS unit and in the field logbook as backup. The transect paths were conspicuously marked with bio-degradable flagging tape affixed to trees/brush. Every subsurface anomaly detected along the transects using the Schonstedt detector was marked with pin flags until the location of the anomaly was surveyed by the GPS unit. This SI did not include or require MEC clearance activities. The maximum depth of the survey was approximately five feet, depending on the size and metallic qualities of the anomaly.

3.2 SOIL SAMPLING AND LABORATORY ANALYSIS

Sampling included collection of surface soil from areas where MEC was identified at the surface through the visual survey of the CPG Kickout Area. Ten samples were collected to characterize MC in the shallow soil. The samples were collected from soil within 6 inches of the ground surface at biased locations as depicted on Figure 3-1. Samples were collected using a high density polyethylene dedicated, disposable hand shovels that eliminated the need to decontaminate the sampling equipment between sample locations. The samples were retained in laboratory-supplied, pre-cleaned glass jars. Samples were placed in an ice-cooled chest pending shipment to the testing laboratory using an overnight courier service.

Each sample location was surveyed using a hand held Trimble GeoXH GPS unit with four inch positioning accuracy.

Samples were analyzed by TestAmerica Laboratory in Denver, Colorado, which is accredited by the DoD Environmental Laboratory Accreditation Program (ELAP) for each test method. The laboratory is also accredited in the State of Louisiana for each test method.

Collected environmental samples were tested for the following:

- Target Analyte List (TAL) metals using USEPA SW846 test methods 6020A, 6010C, and 7471B;
- Perchlorate using USEPA SW846 test method 6860; and
- Explosives, including N-methyl-N-2,4,6-tetranitroaniline (tetryl), 2,4,6-trinitrotoluene (TNT), cyclotrimethylenetrinitramine (RDX), and cyclotetramethylenetetranitramine (HMX) using USEPA SW846 test method 8330A.

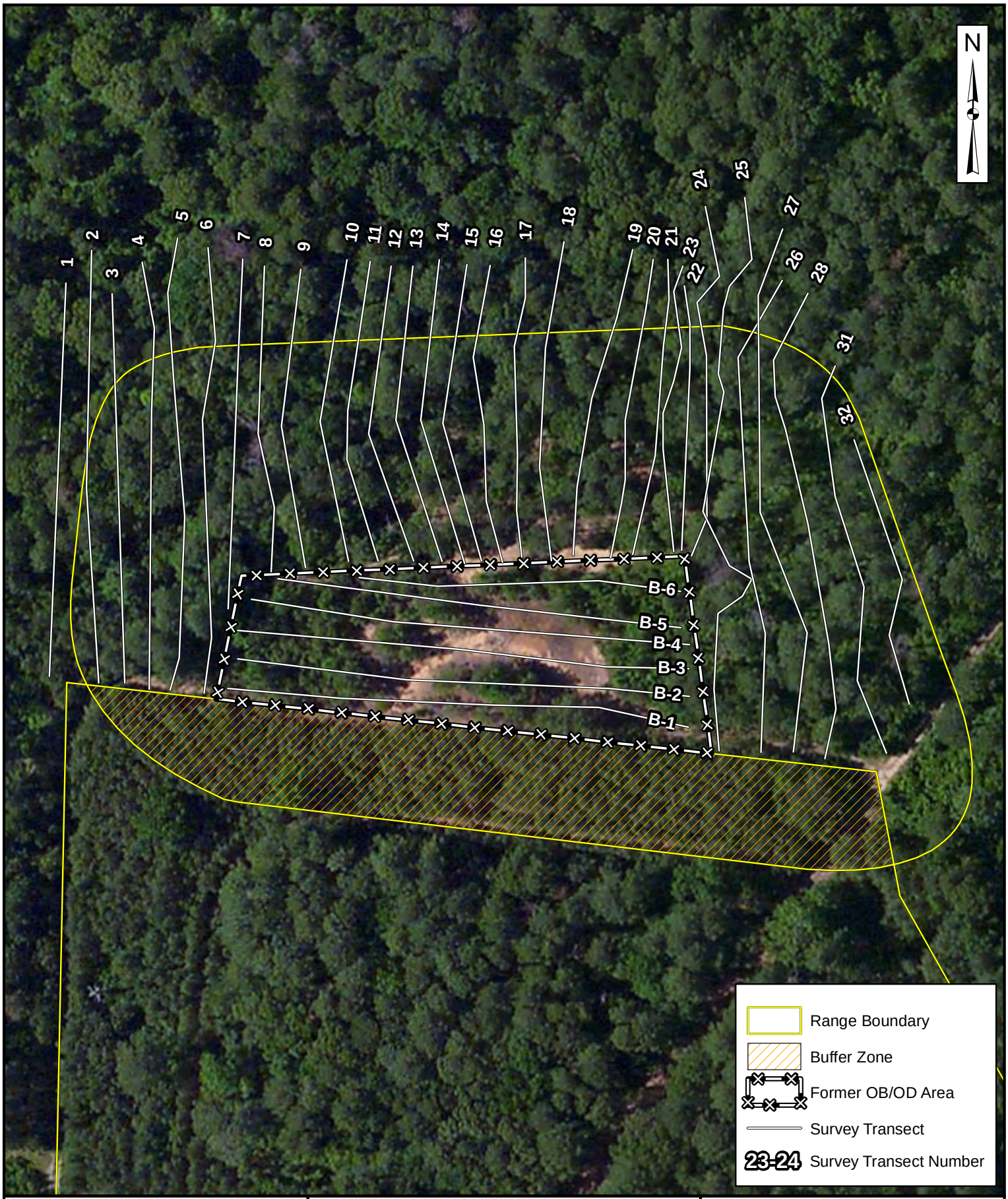
3.3 DATA VALIDATION AND DATA ANALYSIS

Data validation was performed for the collected environmental and quality control (QC) samples by Laboratory Data Consultants, Inc. in Carlsbad, California. Data validation included a review of the data to ensure correct test methods, and to confirm acceptable holding times, and extraction dates. The data was also evaluated for accuracy, precision, representativeness, completeness, comparability, and sensitivity. Overall, the data was determined to reflect site conditions and be fully usable for its intended purpose.

According to the Final ROD for OU-4 (Shaw, 2006a), the CPG Kickout Area currently has an industrial land use deed restriction; therefore, the analytical results were compared to industrial use standards. The Louisiana Department of Environmental Quality (LDEQ) Risk Evaluation / Corrective Action Program (RECAP) Table 1 was used to screen the reported concentrations for human health and the environment. Where LDEQ RECAP standards were not available, results were compared to the EPA Region 6 Industrial Soil Regional Screening Levels (RSLs).

3.4 FIELD DOCUMENTATION

The survey team maintained a field log book during field activities that included the GPS coordinates of the anomalies. The survey team also collected photographic documentation (Appendix B) of areas where the survey team could not traverse due to vegetation, debris piles, and metal fragments that were observed on the surface. The survey data tracking and project maps were reviewed and updated each day.



1 inch = 100 feet

0 50 100 150 200 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 3-1
CPG Kick Out Area
Transect Map
Louisiana Army National Guard
CAMP MINDEN, LOUISIANA

Stellee Environmental Enterprises, Inc.
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(610) 286-0100
www.stellee.com

Completed by: jdeloretta on 4/4/2014 G:\Projects\1293 Camp Minden\Site Investigation Report\CPG\Figure 3-1 Transect Map CPG.mxd

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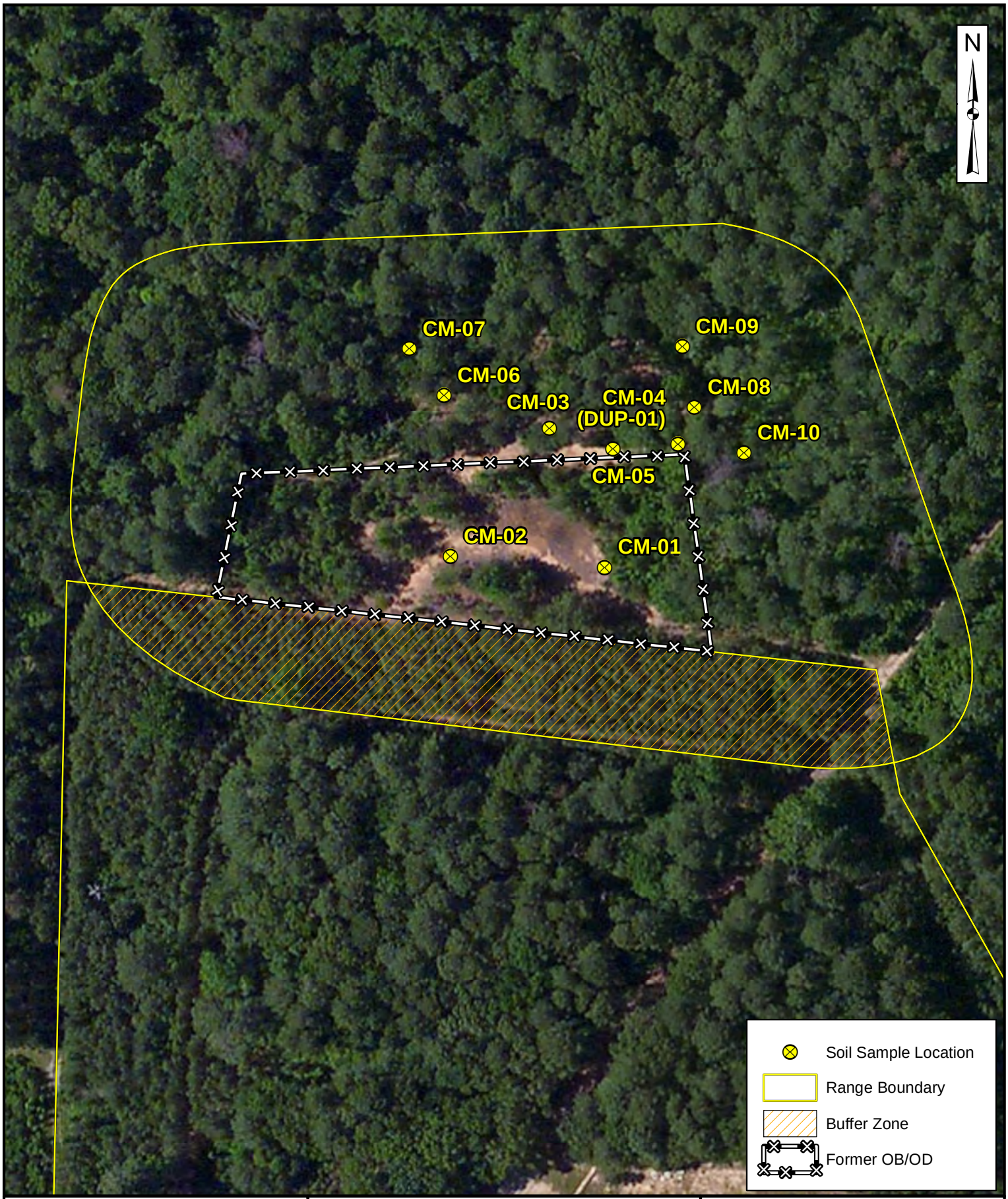

1 inch = 100 feet

0 50 100 150 200 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 3-2
CPG Kick Out Area
Sample Locations
Louisiana Army National Guard
CAMP MINDEN, LOUISIANA

Stellee Environmental Enterprises, Inc.
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25 East Main Street
Elverson, PA 19520
(610) 286-0100
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Completed by: jdeloretta on 4/4/2014 G:\Projects\1293 Camp Minden\Site Investigation Report\CPG\Figure 3-2 Sample Locations CPG.mxd

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4.0 MEC EVALUATION

4.1 FIELD OBSERVATIONS AND HISTORICAL EVIDENCE OF MEC

The CPG Kickout Area is an approximate 4.4 acre parcel located on the north perimeter of the previously MMRP assessed CPG site. The Kickout Area is heavily forested with secondary growth loblolly pine and lesser amounts of miscellaneous hardwoods. The site is fenced with a barbed-wire fence that had observed breaks or gaps in the fencing. There is a smaller trapezoidal shaped area within the CPG Kickout Area that is surrounded by a chain-linked fence. This area was used briefly as an open burn / open detonation (OB/OD) area between 1940 and 1952, during operation of the CPG.

Ordnance was observed scattered over the surface area within the CPG Kickout Area during a 2011 site visit conducted by LAARNG. At that time, the parcel was noted to possess a large volume of shrapnel and detonated ordinance on the surface. Of concern was the potential presence of UXO extending beyond the fenced boundary of the Kickout Area. While Camp Minden in general has controlled access, the site is periodically open to hunters and there is the potential for trespassers. The SI field team noted that fallen trees have compromised the integrity of the fence surrounding the Kickout Area. According to LAARNG personnel, there are currently no short term or long terms plans for use or reuse of the site.

The field team completed a geophysical survey consisting of 32 north/south transects and 6 east/west transects totaling approximately 2.4 miles within the CPG Kickout Area. The transect locations are shown on Figure 3-1. Transect paths wavered slightly to significantly during execution of geophysical activities to the presence of heavy vegetation. Furthermore, transects were extended beyond the fence line due to the continued presence of anomaly detection as indicated on Figure 4-1. An additional 2.45 acres were surveyed to the north of the fence line. A total of approximately 6.75 acres were surveyed. The strong presence of MEC was identified during the survey based on magnetic anomalies and visual evidence.

Two hundred twenty-three (223) anomalies were detected throughout the CPG Kick-out Area, with 77 anomalies recorded as multiple responses representing anomaly clusters. Figure 4-1 depicts the locations of the single anomalies and the anomaly clusters. During the field survey, MEC and MPPEH were visually observed throughout the survey limits. Several of the MEC identified contained a yellow substance believed to be tetryl, which would be consistent with soil analytical results (Photograph 10, Appendix B). Identified MEC primarily consisted of fuzes and projectile bodies as depicted in Photographs 5 through 7, Photographs 9 through 11, and Photograph 15.

4.2 SOIL ANALYSIS RESULTS

The 2014 surface soil explosives analytical results are presented in Table 4-1. Soil sample locations are depicted on Figure 3-2. Soil analytical results indicated trace level detections of explosives related chemicals of concern for three compounds. Three samples contained detections of tetryl and five samples contained detections of perchlorate above the laboratory method detection limit. The explosive compound 1,2-dinitrobenzene was reported in each of the soil samples ranging from 2.4 to 2.7 milligrams per kilogram (mg/kg). These are known explosive compounds used to make detonators and explosive booster charges. Tetryl is a nitramine booster explosive and is a predecessor of RDX. Tetryl is typically mixed with mercury fulminate and potassium chlorate to ensure detonation of the tetryl. None of the

reported explosives concentrations exceed the RECAP industrial soil screening standards or the EPA Region 6 Industrial Soil RSLs.

The 2014 surface soil metal analytical results are presented in Table 4-1. Results from the metals analysis indicated that several of the TAL metals were present at elevated levels within the surface soil samples. With the exception of the arsenic concentration of 14 mg/kg in sample CM-01, which exceeds the RECAP industrial soil screening standard of 12 mg/kg, none of the remaining metal concentrations exceeded their RECAP industrial screening level for soil. There are no published RECAP industrial soil screening standards for iron and mercury; therefore these concentrations were compared to the EPA Region 6 Industrial Soil RSLs. Iron concentrations of 73,000 mg/kg and 81,000 mg/kg in sample CM-01 and CM-02, respectively, were detected above the EPA Region 6 Industrial Soil RSL of 72,000 mg/kg. Mercury was detected in each sample collected ranging from 6.4 to 50. Mercury concentrations in samples CM-01, CM-04, CM-05, CM-06, CM-08, CM-09, and CM-10 exceeded the EPA Region 6 Industrial Soil RSL of 4.3 mg/kg.

Eleven surface soil samples were collected at the CPG during the 1996 and 2002 soil sampling investigations. A summary of the metals results from those investigations is presented in Appendix C. The soil analytical results from the 1996 and 2002 investigations are consistent with the mercury concentrations reported from this SI. The arsenic and iron concentrations in samples from this SI were not consistent with previous data collected at the CPG. Arsenic concentrations from the previous investigations ranged from 0.443 mg/kg to 4.17 mg/kg while concentrations from this SI ranged from 2.1 mg/kg to 14 mg/kg. Iron concentrations from the previous investigations ranged from 7,500 mg/kg to 33,700 mg/kg while concentrations from this SI ranged from 4,800 mg/kg to 81,000 mg/kg.

Table 4-1: Surface Soil Analytical Results

Client Sample ID:		LDEQ RECAP TABLE 1[1]	EPA Region 6 RSL Summary Table[2]	CM-01		CM-02		CM-03		CM-04		CM-05		CM-06		CM-07		CM-08		CM-09		CM-10	
Date Sampled:				1/15/2014	Q	1/15/2014	Q	1/15/2014	Q	1/15/2014	Q	1/15/2014	Q	1/15/2014	Q	1/15/2014	Q	1/15/2014	Q	1/15/2014	Q	1/15/2014	Q
Explosives (discrete sampling)																							
1,3,5-Trinitrobenzene	mg/kg	NS	2700.0	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
1,2-Dinitrobenzene	mg/kg	NS	6.2	2.5		2.4		2.4		2.5		2.5		2.4		2.6		2.5		2.7		2.6	
1,3-Dinitrobenzene	mg/kg	5.0	6.2	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
2,4,6-Trinitrotoluene	mg/kg	NS	42.0	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
2,4-Dinitrotoluene	mg/kg	98.0	5.5	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
2,6-Dinitrotoluene	mg/kg	46.0	1.2	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
2-Amino-4,6-dinitrotoluene	mg/kg	NS	200.0	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
4-Amino-2,6-dinitrotoluene	mg/kg	NS	190.0	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
HMX	mg/kg	NS	4900.0	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
m-Nitrotoluene	mg/kg	NS	6.2	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
Nitrobenzene	mg/kg	25.0	24.0	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
o-Nitrotoluene	mg/kg	NS	13.0	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
p-Nitrotoluene	mg/kg	NS	110.0	<0.18	U	<0.16	U	<0.17	U	<0.17	U	<0.17	U	<0.17	U	<0.17	U	<0.16	U	<0.18	U	<0.17	U
RDX	mg/kg	NS	24.0	<0.090	U	<0.082	U	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	<0.082	U	<0.090	U	<0.086	U
Tetryl	mg/kg	NS	120.0	<0.090	U	0.24	J	<0.083	U	<0.084	U	<0.084	U	<0.083	U	<0.087	U	1.7		0.079	J	<0.086	U
Perchlorate	mg/kg	NS	72.0	<0.00029	U	<0.00030	U	<0.00028	U	<0.00031	U	0.00058	J	0.00008	B	0.00016	B	0.000091	B	0.00012	B	0.00036	U
Target Analyte List Metals																							
Aluminum	mg/kg	NS	99,000.0	26,000		26,000	J	11,000		10,000		12,000		8,800		4,700		14,000		9,300		14,000	
Antimony	mg/kg	82	41.0	2.8		1.8	J	<0.61	U	<0.74	U	<0.66	U	<0.73	U	<0.79	U	<0.74	U	<0.71	U	<0.86	U
Arsenic	mg/kg	12	2.4	**14**		9.9		5.5		3.6		3.4		9.6		2.1	J	2.8	J	3		5.4	
Barium	mg/kg	14,000	19,000.0	56		340	J	68		82		88		89		94		90		130		130	
Beryllium	mg/kg	410	200.0	1.1		0.98		0.57		0.65		0.48	J	0.64		0.32	J	0.7		0.79		0.68	J
Cadmium	mg/kg	100	80.0	7.1		30	J	2.8		5		6.7		15		2.1		1.5		1.1		1.1	
Calcium	mg/kg	NS	NS	250		1,300		360		520		540		710		720		500		960		660	
Chromium	mg/kg	610	NS	39		32		12		10		11		19		5.5		11		8.5		15	
Cobalt	mg/kg	12,000	30.0	9.1		8.8		5.1		3.4		3.7		5.4		5.3		3.6		11		3.4	
Copper	mg/kg	8,200	4,100.0	1,100		1,900	J	370		1,200		780		890		78		650		900		270	
Iron	mg/kg	NS	72,000.0	**73,000**		**81,000**	J	18,000		13,000		11,000		18,000		4,800		11,000		8,200		15,000	
Lead	mg/kg	1,400	800.0	450		440	J	64		63		44		43		25		33		31		38	
Magnesium	mg/kg	NS	NS	240		540		320		440		420		370		310		470		420		630	

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Table 4-1: Surface Soil Analytical Results

Client Sample ID:		LDEQ RECAP TABLE 1[1]	EPA Region 6 RSL Summary Table[2]	CM-01		CM-02		CM-03		CM-04		CM-05		CM-06		CM-07		CM-08		CM-09		CM-10	
Date Sampled:				**1/15/2014**	**Q**	**1/15/2014**	**Q**	**1/15/2014**	**Q**	**1/15/2014**	**Q**	**1/15/2014**	**Q**	**1/15/2014**	**Q**	**1/15/2014**	**Q**	**1/15/2014**	**Q**	**1/15/2014**	**Q**	**1/15/2014**	**Q**
Target Analyte List Metals (continued)																							
Manganese	mg/kg	NS	2,300.0	640		890	J	300		400		650		920		1,400		430		570		280	
Mercury	mg/kg	NS	4.3	**6.5**		2.0	J	1.4		**50**		**8.9**		**6.4**		0.94		**15**		**8.7**		**8.8**	
Nickel	mg/kg	4,100	2,000.0	77		32		17		6.8		8.1		10		5.7		11		10		6.4	
Potassium	mg/kg	NS	NS	310	J	380		390		420		400		310	J	230	J	420		350	J	620	
Selenium	mg/kg	1,000	510.0	<1.4	U	<1.5	U	1.4		<1.5	U	<1.3	U	<1.5	U	<1.6	U	<1.5	U	<1.4	U	<1.7	U
Silver	mg/kg	1,000	510.0	0.18	J	1.1	J	<0.20	U	<0.25	U	<0.22	U	<0.24	U	<0.26	U	<0.25	U	<0.24	U	<0.29	U
Sodium	mg/kg	NS	NS	<110	U	400	J	<100	U	<120	U	<110	U	<120	U	<130	U	<120	U	<120	U	<140	U
Thallium	mg/kg	14	1.0	<1.4	U	<1.5	U	<1.2	U	<1.5	U	<1.3	U	<1.5	U	<1.6	U	<1.5	U	<1.4	U	<1.7	U
Vanadium	mg/kg	1,400	510.0	26		21		15		17		17		26		10		18		14		25	
Zinc	mg/kg	61,000	31,000.0	12,000		3700	J	1,600		280		330		340		130		140		170		130	

Notes:

1 - Louisiana Department of Environmental Quality Table 1: Screening Option, Screening Standards for Soil and Groundwater.
2 - United States Environmental Protection Agency Regional Screening Levels (RSL) Summary Table, EPA Region 6.
J - Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value.
NS - No standard available.
Q - Data qualifier
U - Undetected to the Method Detection Limit
Bold and Shaded - Analyte was detected above the LDEQ RECAP or USEPA RSL Values.

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4.3 MEC RISK ASSESSMENT

Use of the CPG Kickout Area is currently restricted, prohibiting its use for training activities, forestry, or other uses. The installation is currently under a site wide groundwater use restriction prohibiting the consumption and use of groundwater. Access to the CPG Kickout Area is controlled for maintenance and other site workers; however, evidence that MEC and MPPEH extend beyond the northern fence line was noted. There are currently no planned future uses for the site, and there are no current plans that would include residential, commercial, or light industrial uses. Receptors at the CPG Kickout Area include authorized installation personnel (i.e., base maintenance workers and construction workers), authorized contractors and visitors, and trespassers.

Camp Minden is located in the Upper West Gulf Coastal Plain Ecoregion. Woodlands cover approximately two-thirds of the available land on the installation. In general, the CPG Kickout Area is covered by dense loblolly pine and lesser amounts of miscellaneous hardwoods. The current degree of land disturbance at the Kickout Area is low.

Previous ecological resource evaluations did not identify critical habitats for threatened or endangered species, or sensitive ecosystems such as wetlands or breeding grounds. However, the 2005 e^2M SI Report indicated that the CPG may provide suitable habitat for the federally listed Red-cockaded Woodpecker. Additionally, the 2005 previous risk analysis completed for terrestrial receptors indicated that all hazard indices (HIs) generated for mammals and invertivorous birds are greater than an HI of 1 for all contaminants of potential ecological concern (COPECs). HIs for mercury were greater than 1 for the carnivorous mammal (red fox) and bird (red tailed hawk). The highest HIs were generated for copper at 5.4 and mercury at 1.24 (PMC, 2003). If the HI is calculated to be greater than 1 then the systemic effects are assumed to be of concern.

The CPG and CPG Kickout Area are undeveloped and there are no current plans for future use. Visual confirmation of MEC was observed throughout the area during this SI. Chemical analysis for explosives and metals confirmed the presence of trace concentrations of explosive compounds, and elevated concentrations of iron, mercury, and arsenic. Based on these findings further investigation is warranted.

The human health risk assessment completed for the CPG Area under a previous MMRP investigation addressed risk from MEC that potentially remains in the subsurface soil by reducing or eliminating exposure of human contact through ICs or LUCs such as access/use restrictions, no dig restriction, and conveyance notices. It was further determined that under the industrial use scenario, human health risks are within acceptable range and no further remedial actions are required. However, limited site specific chemical and physical data was used to characterize the human and ecological risks. Based on the additional data obtained during this investigation and the volume of MEC still present on the site, further sampling is warranted to adequately characterize human and ecological risks as part of a RI/FS for the CPG Kickout Area. Given the significant quantities of deteriorated MEC observed on the surface, additional subsurface soil samples should be collected to assess contaminant concentrations and to ensure that MC concentrations do not pose an explosive hazard or exceed the RECAP or USEPA risk based concentrations.

According to the 2005 SI Report completed by e^2M, soil contamination for mercury, arsenic, and iron has been documented and found not to present an ecological or human health threat under

the current industrial land use. Mercury concentrations reported in the analyzed samples from this SI are consistent with the previous investigations at the adjacent CPG; therefore, it can be assumed that mercury does not present an ecological or human health threat under the current land use. Iron and arsenic concentrations in samples from this SI were not consistent with the previous investigations in that the concentrations were higher by less than an order of magnitude. Iron and arsenic are COCs that have the potential to pose an ecological or human health threat under the current industrial land use scenario.

4.4 MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL

This section discusses application of the MRSPP for the Camp Minden CPG-Kickout Area. The DoD proposed the MRSPP (32 Code of Federal Regulations [CFR] Part 179) to assign a relative risk priority to each defense site in the MMRP Inventory for response activities. These response activities are based on the overall conditions at each MRA and MRS and consider various factors related to explosive safety and environmental hazards. The application of the MRSPP applies to all locations:

- That are or were owned, leased to, or otherwise possessed or used by the DoD.
- That are known to or are suspected of containing MEC or MC.
- That are included in the MMRP Inventory.

In assigning a relative priority for response activities, the DoD generally considers MRAs and MRSs posing the greatest hazard as being the highest priority. In the MMRP, the MRSPP priority will be one factor in determining the sequence in which munitions response actions are funded.

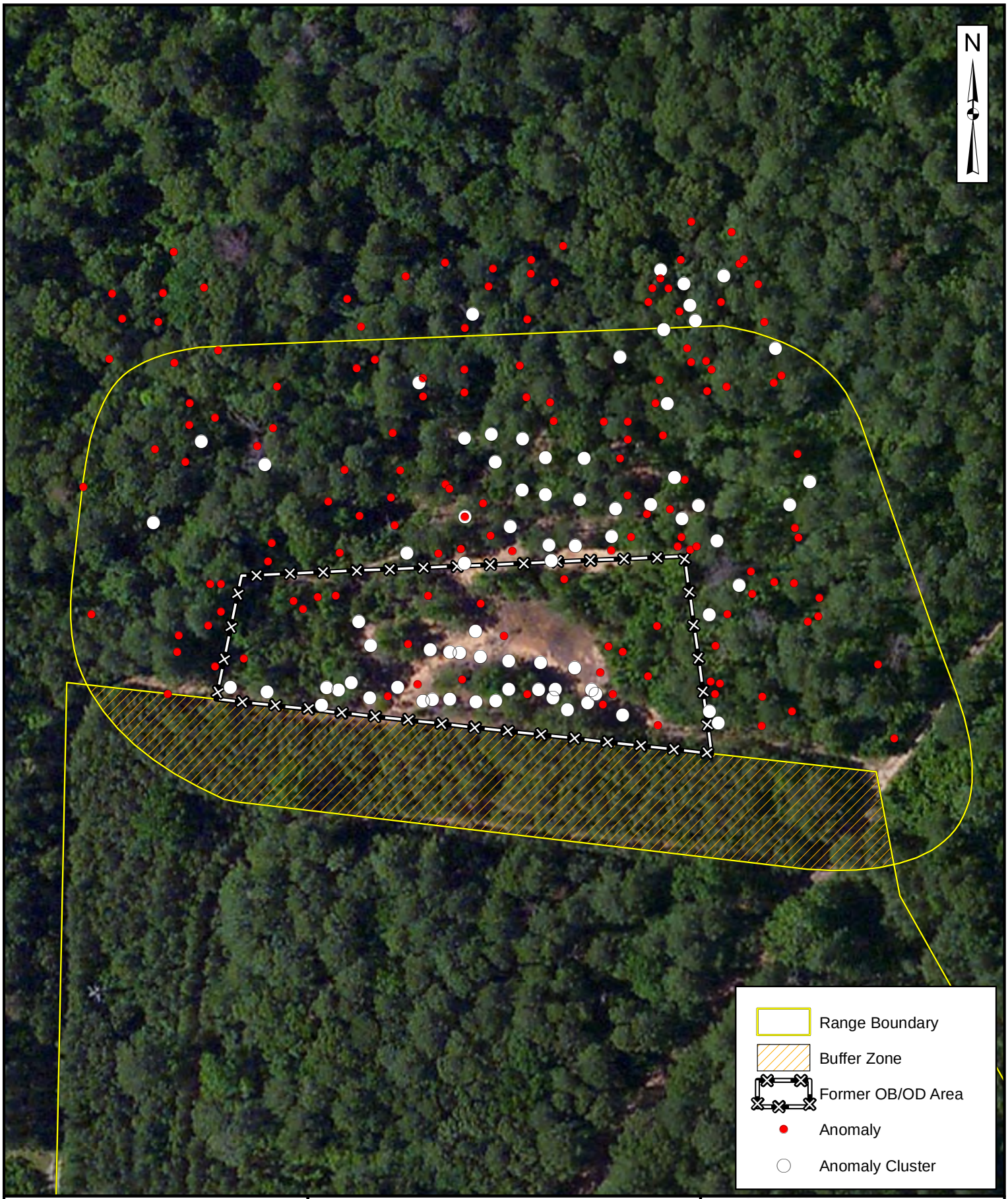
There are three modules used to evaluate the unique characteristics of each type of hazard:

- The Explosive Hazard Evaluation (EHE) Module addresses explosive hazards posed by UXO, DMM, and MC in high enough concentrations to pose an explosive hazard;
- The Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE) Module addresses hazards associated with the effects of CWM; and
- The Health Hazard Evaluation (HHE) Module addresses chronic health and environmental hazards posed by MC and incidental non-munitions contaminants.

Each module is composed of three categories of information, called factors, that are used to assess the hazard of the UXO, DMM, or MC; how accessible the hazard is; and any receptors potentially affected by the hazard. Each factor is comprised of multiple data elements that capture MRS-specific information. The data elements classify information essential for the characterization of conditions at the MRS.

Much of the EHE module is prepared from existing information and knowledge of the site's history and its surrounding environments. Based on this history, the potential for CWM at Camp Minden is considered to not likely be present. Limited site specific data was obtained to assess the HHE Module. While site-wide groundwater controls and restrictions are in place at Camp Minden, further evaluation is pending to fully characterize the human and ecological hazards.

The MRSPP worksheet tables for the CPG Kickout Area are included in Appendix A.



1 inch = 100 feet

0 50 100 150 200 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 4-1
CPG Kick Out Area
Anomaly Map
Louisiana Army National Guard
CAMP MINDEN, LOUISIANA

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Completed by: jdeloretta on 4/4/2014 G:\Projects\1293 Camp Minden\Site Investigation Report\CPG\Figure 4-1 Anomaly Map CPG.mxd

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5.0 SUMMARY AND CONCLUSIONS

The primary objective of the SI was collect the appropriate amount of information to make one of the following decisions:

- Whether an RI/FS is required at a site;
- Whether an immediate response is needed; or
- Whether the site qualifies for NFA.

Based on these objectives, the following information has been developed to support further efforts at the CPG Kickout Area:

- The land use for CPG Kickout Area is currently restricted and is not projected to change without further MEC clearance. However, the area outside the fence line is open to public access for hunting and other activities.
- More than 200 anomalies were detected throughout the CPG Kick-out Area, with as many as 50 anomalies recorded as multiple responses.
- There is abundant direct visual and magnetic response evidence of MEC and MPPEH throughout the site and extending north of the fence line. Biased sampling at 10 areas adjacent to MEC observed at the surface indicated trace levels of explosive compounds, primarily tetryl, 1,2-dinitrobenzene, and perchlorate. However, 223 anomaly with 77 anomaly clusters were identified with a large volume of MEC observed at the surface; therefore, 10 samples are not a large enough data set to address the potential human health and ecological risk posed by explosives in the surface and subsurface soil at the site.
- Elevated levels of mercury, iron, and arsenic were detected in current and historic surface soil samples. A previous human health and ecological risk assessment for the adjacent CPG area determined that reported mercury concentrations did not pose a risk based on an industrial land use scenario. Mercury concentrations reported for the CPG Kickout Area are consistent with previously collected mercury data for the CPG; therefore, it is assumed that mercury does not present an ecological or human health risk under the current industrial land use scenario.
- Current iron and arsenic concentrations in samples from this SI were not consistent with the previous investigations in that the concentrations were higher by less than an order of magnitude. Both iron and arsenic should be added along with explosives to the list of COCs at the CPG Kickout Area.
- For the MRSPP much of the EHE module is prepared from existing information and knowledge of the site's history and its surrounding environments. Based on this history, the potential for CWM at Camp Minden is considered to not likely be present. Limited site specific data was obtained to assess the HHE Module. While site-wide groundwater controls and restrictions are in place at Camp Minden, further evaluation is pending to fully characterize the human and ecological hazards.

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6.0 RECOMMENDATIONS

The SI included the performance of a survey of the CPG Kickout Area to determine if munitions were present in the surface based on magnetic and visual inspection of the area. Efforts to assess this area included a visual inspection and a magnetic survey along 38 transects to assess the presence or absence of potential munitions within the boundaries of the CPG Kickout Area. Based on the prevalence of magnetic anomalies across the site, visual evidence of MEC and MPPEH, and evidence of these materials beyond the current confines of the CPG Kickout Area, there is sufficient evidence to warrant further investigation to address the MEC present at the site.

Based on the chemical data obtained to date and the number of potential MEC/MPPEH still present on site, further surface and subsurface sampling is recommended to better address human and ecological risks. An RI/FS is required based on the identified presence and distribution of MEC at the site. It is recommended that the LAARNG assess the nature and extent of the MEC and MC as part of the RI. Immediate actions are recommended to expand and repair the current fence surrounding the site and use of land use restrictions to control access should continue. The initial area of interest (AOI) should also be expanded by approximate 2.45 acres beyond the current barbed-wire fence to include the area where anomalies were detected as part of this SI field investigation, as shown in Figure 6-1.

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1 inch = 100 feet

0 50 100 150 200 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 6-1
CPG Kick Out Area
Expanded Area of Interest
Louisiana Army National Guard
CAMP MINDEN, LOUISIANA

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Completed by: jdeloretta on 4/4/2014 G:\Projects\1293 Camp Minden\Site Investigation Report\CPG\Figure 5-1 Expanded Area of Interest.mxd

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APPENDIX A

MRSPP Worksheet Tables

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Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: CPG Kickout

Component:

Installation/Property Name: Camp Minden

Location (City, County, State): Minden, Webster and Bossier Counties, LA

Site Name/Project Name (Project No.): Camp Minden CPG Kickout

Date Information Entered/Updated: 5/12/2014 9:38:06 AM

Point of Contact (Name/Phone): Jerry Gaccetta 770-421-3419

Project Phase (check only one):

o PA	n SI	o RI	o FS	o RD
o RA-C	o RIP	o RA-O	o RC	o LTM

Media Evaluated (check all that apply):

o Groundwater	o Sediment (human receptor)
n Surface soil	o Surface Water (ecological receptor)
o Sediment (ecological receptor)	o Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

Camp Minden, formerly the Louisiana Army Ammunition Plant, operated from mid 1950 to 1990 for testing and burning of munitions. The CPG Kickout was likely associated with burning operations conducted on raised berms. Examples of potential material destroyed and tested associated with the CPG area include:
- M16 mine, AP M14 Mine, AP activator, M2;
- BLU-3 A/B bomb;
- AP adaptor booster
- M904 bomb fuze;
- M905 bomb fuze;
- Primers for 57 millimeter (mm) projectiles, detonators for fuzes;
- M427 fuze for 2.75 warhead; and
- M423 fuze for 2.75 warhead.

Source: URS Corporation (URS). 2010. Environmental Condition of Property Report Former Louisiana Army Ammunition Plant Doyline, Louisiana. November. Section 3.3.4.6

Description of Pathways for Human and Ecological Receptors:

Site has not been fully characterized.
Description of Receptors (Human and Ecological):
Human resceptors include authorized installation personnel (i.e., base maintenance workers and construction workers), authorized contractors, visitors, and trespassers. CPG may provide suitable habitat for the federally listed Red-cockaded Woodpecker. Additionally, the 2005 previous risk analysis completed for terrestrial receptors indicated all hazard indices (HIs) generated for mammals and invertivorous birds are greater than one for all COPECs. HIs for mercury were greater than one for the carnivorous mammal (red fox) and bird (red tailed hawk).

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms practice munitions, small arms ammunition, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	u UXO that are considered likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). u Hand grenades containing energetic filler. u Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazardard.	30
High explosive (used or damaged)	u UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." u DMM containing a high-explosive filler that have: n Been damaged by burning or detonation n Deteriorated to the point of instability.	*25*
Pyrotechnic (used or damaged)	u UXO containing a pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). u DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: n Been damaged by burning or detonation n Deteriorated to the point of instability.	20
High explosive (unused)	u DMM containing a high explosive filler that: n Have not been damaged by burning or detonation n Are not deteriorated to the point of instability.	15
Propellant	u UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). u DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: n Damaged by burning or detonation n Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrothechnics, or propellant	u DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). u DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	u DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: n Have not been damaged by burning or detonation n Are not deteriorated to the point of instability.	10
Practice	u UXO that are practice munitions that are not associated with a sensitive fuze. u DMM that are practice munitions that are not associated with a sensitive fuze and that have not: n Been damaged by burning or detonation n Deteriorated to the point of instability.	5
Riot control	u UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	u Used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	u Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	*25*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

MEC identified during the 2014 Site Investigation included a yellow substance believed to be N-methyl-N-2,4,6-tetranitroaniline (tetryl) which would be consistent with soil analytical results. MEC identified during the SI primarily consisted of fuzes and projectile bodies. (Draft Site Inspection Report, CPG Kickout Area, April 2014 prepared by Stell Enterpirses, Inc.)

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms former range, practice munitions, small arms range, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	u The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	u The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	*8*
Former practice munitions range	u The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	u The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	u The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	u The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	u The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	u The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	u The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	u The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	u Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	*8*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

Camp Minden is also known as the former Louisiana Army Ammunition Plant (LAAP) that was originally acquired by the United States (U.S.) Government in 1941 for the purpose of ammunition production. The CPG area proper occupies approximately 21 acres. The northern-most section of the CPG was used for demolition purposes. The CPG Kickout Area is located at the northern most extent of the CPG area and comprises an area of approximately 4.3 acres. Historic records indicate this area was likely associated with burning operations conducted on raised berms. (Draft Site Inspection Report, CPG Kickout Area, April 2014 prepared by Stell Enterpirses, Inc.)

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms confirmed, surface, subsurface, small arms ammunition, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	u Physical evidence indicates that there are UXO or DMM on the surface of the MRS. u Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO	*25*
Confirmed subsurface, active	u Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS,and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. u Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	u Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. u Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	u There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	u There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	u There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	u The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	u Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	*25*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

During the 2014 SI, field teams completed a geophysical survey of approximately 2.4 miles along 32 north/south transects and 6 east/west transects within the CPG Kickout Area. Both magnetic and visual indications were highly evident regarding the presence of MEC during the survey. More than 200 anomalies were detected throughout the CPG Kick-out Area, with as many as 50 anomalies recorded as multiple responses. During the 2014 SI field survey, MEC and Material Potentially Presenting an Explosive Hazard (MPPEH) were readily present throughout the survey limits. (Draft Site Inspection Report, CPG Kickout Area, April 2014 prepared by Stell Enterpirses, Inc. Section 4.1)

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term barrier is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	There is a barrier preventing access to parts of the MRS, but not the entire MRS.	*8*
Barrier to MRS access is complete but not monitored	There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	*8*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classifications in the space provided.

During the 2014 SI activities, it was noted that the condition of the fence surrounding the Kickout Area was compromised by fallen trees in addition to the fact that MEC extended beyond the fenced boundary of CPG Kickout. (Draft Site Inspection Report, CPG Kickout Area, April 2014 prepared by Stell Enterpirses, Inc. Section 4.1)

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	▫ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	*5*
Scheduled for transfer from DoD control	▫ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	▫ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	*5*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classifications in the space provided.

Camp Minden is currently under the control of the State of Lousiana, LAARNG with controlled access to the property.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Note: Use the U.S. Census Bureau tract data available to capture the highest population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	u There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	5
100–500 persons per square mile	u There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	*3*
< 100 persons per square mile	u There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	*3*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classifications in the space provided.

Parish	Area (square miles)	Population	Population Density (persons/square mile)
Bossier	840.06	116,979	139.3
Webster	593.03	41,207	69.5

Source: U.S. Census Bureau, 2010

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and select the score that corresponds with the number of inhabited structures.

Note: The term inhabited structures is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	*3*
6 to 10 inhabited structures	There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	*3*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classifications in the space provided.

The nearest towns outside the Camp Minden property boundary include Doylin, south and adjacent to the installation and Goodwin, located north across State Highway 80. Within 1-mile of the buffer of the installation are approximately 2,467 residents (E2M, February 2009. Type II Work Plan Military Munitions Response Program, Munition Response Sites Remedial Investigation. Section 2.3.3.2)
Camp Minden activites also include industrial/manufacturing operations within two miles of the CPG Kickout Area boundary.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present withinn two miles of the MRS and circle the scores that correspond with **all** the activities/structures classifications at the MRS.

Note: The term inhabited structure is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	u Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	*5*
Parks and recreational areas	u Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	u Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	u Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	u There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

Aside from the residential areas adjacent to the property, Camp Minden activites also include industrial/manufacturing operations and the LAARNG Administrative Area within two miles of the T-7 boundary.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms ecological resources and cultural resources are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	u There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	u There are ecological resources present on the MRS.	3
Cultural resources present	u There are cultural resources present on the MRS.	3
No ecological or cultural resources present	u There are no ecological resources or cultural resources present on the MRS.	*0*
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	*0*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classifications in the space provided.

Previous ecological resource evaluations did not identify critical habitats for threatened or endangered species, or sensitive ecosystems such as wetlands or breeding grounds. However, the 2005 e2M SI Report indicated that the CPG may provide suitable habitat for the federally listed Red-cockaded Woodpecker. (Stell Environmental Enterprises, Inc. April 2014 Site investigatin Report, CPG Kickout Area)

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	25	33
Source of Hazard	Table 2	8	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	25	38
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	3	11
Population Near Hazard	Table 7	3	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			*82*

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	*B*
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	*B*

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond to **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms CWM/UXO, CWM/DMM, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS is: u CWM that are UXO (i.e., CWM/UXO). u Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	u The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	u The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: u Nonexplosively configured CWM/DMM either damaged or undamaged u Bulk CWM (e.g., ton container).	15
CAIS K941 and CAIS K942	u The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	u CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	u Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	*0*
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	*0*

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

LAAAP was acquired by the US government in 1941 with the intent of constructing the Louisiana Ordnance Plant whose primary function was to load, assemble, and pack ammunition items. By 1942, eight ammunition loading lines and one ammonium nitrate graining plant were completed. The mission was expanded during the Korean conflict to include the manufacture of shell casings and metal parts for 155 millimeter (mm) projectiles. The plant operated during World War II (WWII), the Korean and Vietnam conflicts, and lastly during the Persian Gulf War producing various types of shells, aerial bombs, mines, fuzes, boosters, grenades, primers, and related munitions. Between armed conflicts, the plant was typically deactivated, although the plant was in a state of either partial or full production throughout the Vietnam conflict until the Persian Gulf War. There is no evidence that CWM was ever produced, stored, loaded, or disposed of at LAAAP. In addition, no suspect CWM materials were discovered/identified during the SI field work.

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			*0*

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional groundwater contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and display the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard	o

Table 21 Comments: Investigations completed at CPG-Kickout to date are absent actual groundwater analytical data. While groundwater at Minden is groundwater is covered by the 2007 ROD for USEPA OU-5, which selected monitored natural attenuation (MNA) / long-term monitoring (LTM) and institutional controls (ICs) (Shaw 2007). Further assessment is needed to determine if potetnial impacts from CPG-kickout are impacting groundwater.

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface water and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional surface water contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for human endpoints present in the surface water, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L

MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L

RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard	n

Table 22 Comments:

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's sediment and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional sediment contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard n

Table 23 Comments:

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface water and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional surface water contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard	n

Table 24 Comments:

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's sediment and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios together, including any additional sediment contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard	n

Table 25 Comments:

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface soil and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional surface soil contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios
Iron	81000	23000	mg/Kg	3.5
Aluminum	26000	76000	mg/Kg	0.34
Zinc	12000	23000	mg/Kg	0.52
Copper	1900	3100	mg/Kg	0.61
Manganese	1400	3300	mg/Kg	0.42

CHF Scale	CHF Value	Sum The Ratios	11
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	*M*

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	*M*

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	*M*

No Known or Suspected Surface Soil MC Hazard	o

Table 26 Comments: Source: Stell Environmental Enterprises, Inc. April 2014 Site investigatin Report, CPG Kickout Area

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Only use this table if there are more than five contaminants in any given medium present at the MRS. This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the media in which these contaminants are present. Then record all contaminants, their maximum concentrations and their comparison values (from Appendix B of the Primer) in the table below. Calculate and record the ratio for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF for each medium on the

Note: Dissolved, rather than total, metals analyses are used when both are available.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio
Surface Soil	1,2-Dinitrobenzene	2.7	6.1	0.44
Surface Soil	Antimony	2.8	31	0.09
Surface Soil	Arsenic	14	22	0.64
Surface Soil	Barium	340	16000	0.021
Surface Soil	Beryllium	1.1	150	0.0073
Surface Soil	Cadmium	30	39	0.77
Surface Soil	Cobalt	11	1400	0.0079
Surface Soil	Lead	450	400	1.1
Surface Soil	Mercury	50	23	2.2
Surface Soil	Nickel	77	1600	0.048
Surface Soil	Perchlorate	0.00058	55	1.1E-05
Surface Soil	Selenium	1.4	390	0.0036
Surface Soil	Silver	1.1	390	0.0028
Surface Soil	Tetryl	1.7	240	0.0071
Surface Soil	Total Chromium (1:6 ratio Cr VI:Cr III)	39	1600	0.024
Surface Soil	Vanadium	26	78	0.33

Table 28
Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the Contaminant Hazard, Migration Pathway, and Receptor Factors for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the Three-Letter Combination boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the HHE Ratings provided below, determine each media's rating (A-G) and record the letter in the corresponding Media Rating box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)					
Surface Water/Human Endpoint (Table 22)					
Sediment/Human Endpoint (Table 23)					
Surface Water/Ecological Endpoint (Table 24)					
Sediment/Ecological Endpoint (Table 25)					
Surface Soil (Table 26)	M	M	M	MMM	D

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the HHE Module Rating box.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	***D***

HHE Ratings (for reference only)	
Combination	**Rating**
HHH	A
HHM	B
HHL	C
HMM	C
HML	*D*
MMM	*D*
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	***Evaluation Pending***
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter rating for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical priority for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the MRS Prioriy or Alternative MRS Rating at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	*3*	C	3	B	3
C	4	D	4	C	4
D	5	E	5	*D*	*5*
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		*Evaluation Pending*	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		*No Known or Suspected CWM Hazard*		No Known or Suspected MC Hazard	
MRS PRIORITY or ALTERNATIVE MRS RATING				*3*	

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APPENDIX B

Photographic Log

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Stell Environmental Enterprises, Inc. ...The Difference!

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
USACE – Fort Worth District	Camp Minden Army National Guard, Louisiana	1293

Photo No. 1	Date: 1/15/14

Direction Photo Taken:

Northeast

Description:

View of field survey team completing transect 32.

Photo No. 2	Date: 1/15/14

Direction Photo Taken:

North

Description:

View of heavily wooded area along the western boundary of CPG Kickout Area.

Stell Environmental Enterprises, Inc. ...The Difference!

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
USACE – Fort Worth District	Camp Minden Army National Guard, Louisiana	1293

Photo No.	Date:
3	1/15/14

Direction Photo Taken:

North

Description:

View of heavily vegetated area along transect 24.

Photo No.	Date:
4	1/15/14

Direction Photo Taken:

North

Description:

View of UXO Tech III using a Schonstedt GA-52cx Magnetic Locator to survey for metallic anomalies along transect 24.

Stell Environmental Enterprises, Inc. ...The Difference!

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
USACE – Fort Worth District	Camp Minden Army National Guard, Louisiana	1293

Photo No. 5	Date: 1/15/14

Direction Photo Taken:

N/A

Description:

View of a bomb fuze located on the surface along transect 21.

Photo No. 6	Date: 1/15/14

Direction Photo Taken:

N/A

Description:

View of a bomb fuze located on the surface along transect 19.

Stell Environmental Enterprises, Inc. ...The Difference!

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
USACE – Fort Worth District	Camp Minden Army National Guard, Louisiana	1293

Photo No. 7	Date: 1/15/14

Direction Photo Taken:

N/A

Description:

View of a bomb fuze located on the surface along transect 14.

Photo No. 8	Date: 1/15/14

Direction Photo Taken:

South

Description:

View of heavily vegetated area along transect 10.

Stell Environmental Enterprises, Inc. ...The Difference!

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
USACE – Fort Worth District	Camp Minden Army National Guard, Louisiana	1293

Photo No.	Date:
9	1/15/14

Direction Photo Taken:

N/A

Description:

View of projectiles piled on the surface of the OB/OD within the CPG Kickout Area.

Photo No.	Date:
10	1/15/14

Direction Photo Taken:

N/A

Description:

View of projectiles containing a yellow substance believed to be tetryl on the surface of the former OB/OD within the CPG Kickout Area.

Stell Environmental Enterprises, Inc. ...The Difference!

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
USACE – Fort Worth District	Camp Minden Army National Guard, Louisiana	1293

Photo No.	Date:
11	1/15/14

Direction Photo Taken:

N/A

Description:

View of projectile on the surface of the former OB/OD within the CPG Kickout Area.

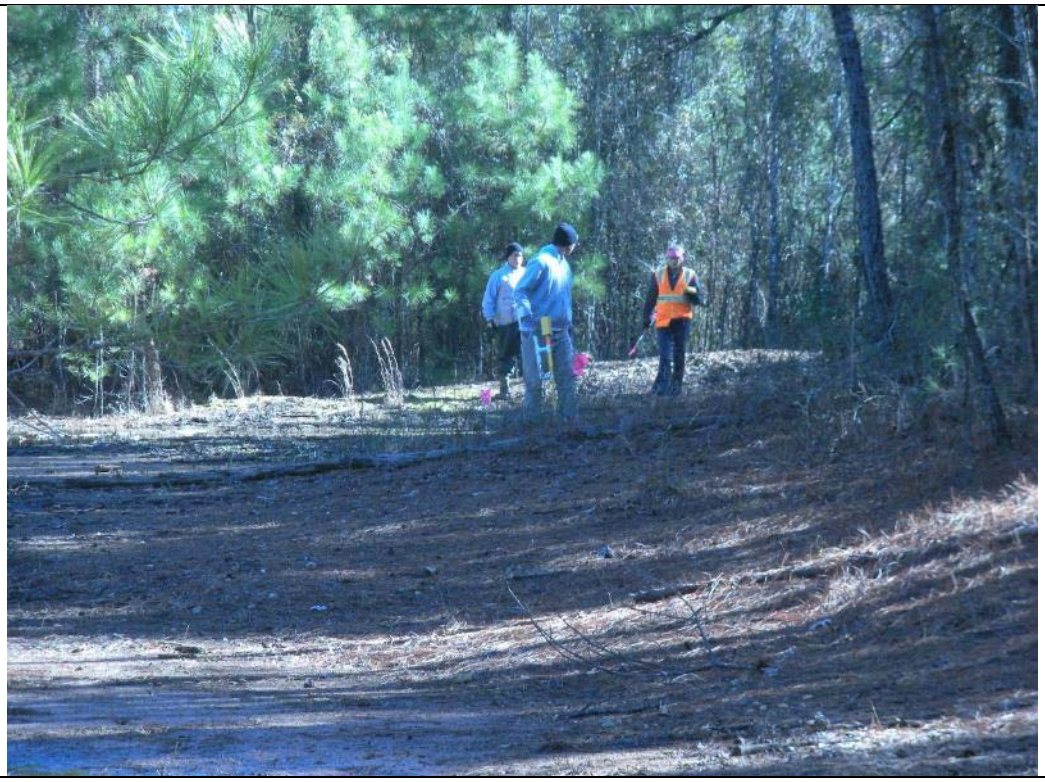
Photo No.	Date:
12	1/15/14

Direction Photo Taken:

East

Description:

View of field survey team completing transect B-2.



Stell Environmental Enterprises, Inc. ...The Difference!

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
USACE – Fort Worth District	Camp Minden Army National Guard, Louisiana	1293

Photo No.	Date:
13	1/15/14

Direction Photo Taken:

East

Description:

View of clearing and small berm within the former OB/OD in the CPG Kickout Area.

Photo No.	Date:
14	1/15/14

Direction Photo Taken:

Northwest

Description:

View of clearing and small berm within the former OB/OD within the CPG Kickout Area. Notice the water filled crater in the center of the fenced in area.

Stell Environmental Enterprises, Inc. ...The Difference!

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
USACE – Fort Worth District	Camp Minden Army National Guard, Louisiana	1293

Photo No.	Date:
15	1/15/14

Direction Photo Taken:

N/A

Description:

View of sample location CM-02 collected adjacent to a pile of projectiles.

Photo No.	Date:
16	1/15/14

Direction Photo Taken:

Southeast

Description:

View of sample location CM-03 collected within a multiple anomaly location.

APPENDIX C

Previous Investigation TAL Metals Results
CPG Area

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Table 3.15-1
Detected Target Parameters in Surface Soil
Central Proving Grounds
Louisiana Army Ammunition Plant
Doyline, Louisiana

Area	Media Type	Site Type	Site ID	Depth (feet)	Sample Date	Method	Test Name	Parameter	Value (µg/g)	Flag Code	Data Qualifier
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	AL	Aluminum	10300		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6020	SB	Antimony	0.651		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6020	AS	Arsenic	2.12		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	BA	Barium	67.6		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	BE	Beryllium	0.611		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6020	CD	Cadmium	3.32		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6020	CR	Chromium	12.8		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	CO	Cobalt	5.84		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	CU	Copper	343		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	FE	Iron	24900		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6020	PB	Lead	73.1		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	MN	Manganese	385		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	7471	HG	Mercury	1.5		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	NI	Nickel	17.7		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6020	TL	Thallium	0.0686	JP	J
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	V	Vanadium	17.5		
CPG	CSO	SURF	CPG0100	0.5	10/5/02	6010	ZN	Zinc	4120		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	AL	Aluminum	9660		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6020	SB	Antimony	0.88		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6020	AS	Arsenic	1.96		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	BA	Barium	106		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	BE	Beryllium	0.537	JP	J
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6020	CD	Cadmium	3.93		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6020	CR	Chromium	11.8		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	CO	Cobalt	9.73		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	CU	Copper	302		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	FE	Iron	11400		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6020	PB	Lead	66.2		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	MN	Manganese	709		

Table 3.15-1
Detected Target Parameters in Surface Soil
Central Proving Grounds
Louisiana Army Ammunition Plant
Doyline, Louisiana

Area	Media Type	Site Type	Site ID	Depth (feet)	Sample Date	Method	Test Name	Parameter	Value (µg/g)	Flag Code	Data Qualifier
CPG	CSO	SURF	CPG0200	0.5	10/5/02	7471	HG	Mercury	1.93		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	NI	Nickel	10		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6020	TL	Thallium	0.0623	JP	J
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	V	Vanadium	14.5		
CPG	CSO	SURF	CPG0200	0.5	10/5/02	6010	ZN	Zinc	1190		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	AL	Aluminum	5340		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6020	AS	Arsenic	0.794		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	BA	Barium	49.6		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	BE	Beryllium	0.369	JP	J
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6020	CD	Cadmium	0.743		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6020	CR	Chromium	10.2		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	CO	Cobalt	4.7	JP	J
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	CU	Copper	83.1		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	FE	Iron	33700		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6020	PB	Lead	13.6		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	MN	Manganese	529		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	7471	HG	Mercury	2.98		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	NI	Nickel	12.3		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6020	TL	Thallium	0.0488	JP	J
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	V	Vanadium	11.8		
CPG	CSO	SURF	CPG0300	0.5	10/5/02	6010	ZN	Zinc	266		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6010	AL	Aluminum	5640		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6020	SB	Antimony	0.369	JP	J
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6020	AS	Arsenic	0.443	JP	J
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6010	BA	Barium	43.3		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6010	BE	Beryllium	0.476	JP	J
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6020	CD	Cadmium	35.4		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6020	CR	Chromium	12.9		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6010	CO	Cobalt	4.35	JP	J

Table 3.15-1
Detected Target Parameters in Surface Soil
Central Proving Grounds
Louisiana Army Ammunition Plant
Doyline, Louisiana

Area	Media Type	Site Type	Site ID	Depth (feet)	Sample Date	Method	Test Name	Parameter	Value (µg/g)	Flag Code	Data Qualifier
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6010	CU	Copper	40.2		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6010	FE	Iron	12000		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6020	PB	Lead	11.2		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6010	MN	Manganese	187		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6020	TL	Thallium	0.0528	JP	J
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6010	V	Vanadium	22.4		
CPG	CSO	SURF	CPG0400	0.5	10/5/02	6010	ZN	Zinc	44.3		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6010	AL	Aluminum	6610		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6020	SB	Antimony	0.599		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6020	AS	Arsenic	4.17		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6010	BA	Barium	58.6		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6010	BE	Beryllium	0.474	JP	J
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6020	CD	Cadmium	12.7		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6020	CR	Chromium	9.07		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6010	CO	Cobalt	7.11		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6010	CU	Copper	54.3		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6010	FE	Iron	6230		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6020	PB	Lead	12.7		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6010	MN	Manganese	291		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6020	TL	Thallium	0.0687	JP	J
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6010	V	Vanadium	13.4		
CPG	CSO	SURF	CPG0500	0.5	10/5/02	6010	ZN	Zinc	58.1		
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	AL	Aluminum	4280		
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	AL	Aluminum	4980	D	
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	SB	Antimony	0.232	JP	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	SB	Antimony	1.19	D	
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	BA	Barium	55.7		
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	BA	Barium	55.3	D	
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	BE	Beryllium	0.542		

Table 3.15-1
Detected Target Parameters in Surface Soil
Central Proving Grounds
Louisiana Army Ammunition Plant
Doyline, Louisiana

Area	Media Type	Site Type	Site ID	Depth (feet)	Sample Date	Method	Test Name	Parameter	Value (µg/g)	Flag Code	Data Qualifier
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	BE	Beryllium	0.516	JPD	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	CD	Cadmium	5.44		
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	CD	Cadmium	5.97	D	
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	CR	Chromium	7.99		
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	CR	Chromium	11.6	D	
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	CO	Cobalt	3.79	JP	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	CO	Cobalt	4.91	JPD	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	CU	Copper	13.8	J	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	CU	Copper	28.3	JD	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	FE	Iron	7030		
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	FE	Iron	7070	D	
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	PB	Lead	13.8	J	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	PB	Lead	23.1	JD	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	MN	Manganese	218		
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	MN	Manganese	257	D	
CPG	CSO	SURF	CPG0600	0.5	10/5/02	7471	HG	Mercury	0.0243	JPD	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	TL	Thallium	0.155	JP	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6020	TL	Thallium	0.0643	JPD	J
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	V	Vanadium	14.9		
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	V	Vanadium	16.5	D	
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	ZN	Zinc	24.5		
CPG	CSO	SURF	CPG0600	0.5	10/5/02	6010	ZN	Zinc	28.8	D	
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	VMS1	ACET	Acetone	0.0036	JP	J
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	AL	Aluminum	5050		
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICM1	SB	Antimony	0.03	JP	J
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICM1	AS	Arsenic	1.52		
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	BA	Barium	68		
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICM1	BE	Beryllium	0.42		
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICM1	CD	Cadmium	0.186	JP	J

Table 3.15-1
Detected Target Parameters in Surface Soil
Central Proving Grounds
Louisiana Army Ammunition Plant
Doyline, Louisiana

Area	Media Type	Site Type	Site ID	Depth (feet)	Sample Date	Method	Test Name	Parameter	Value (µg/g)	Flag Code	Data Qualifier
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	CR	Chromium	13.3		
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	CO	Cobalt	6.73	JP	J
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	CU	Copper	4.02	JP	J
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	FE	Iron	7500		
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	GPB1	PB	Lead	12.5	M	J
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	MN	Manganese	245		
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	NI	Nickel	2.84	JP	J
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	9060	TOC	Total organic carbon	4990		
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	V	Vanadium	16.4		
CPG	CSO	SURF	HA0120PGDS	0.0	5/2/96	ICP1	ZN	Zinc	9.14	M	J
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	AL	Aluminum	44600		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICM1	SB	Antimony	0.479		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICM1	AS	Arsenic	0.858	JP	J
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	BA	Barium	98.3		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICM1	BE	Beryllium	0.331		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICM1	CD	Cadmium	1.29		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	CR	Chromium	32.3		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	CO	Cobalt	6.73	JP	J
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	CU	Copper	1650		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	FE	Iron	20200		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	GPB1	PB	Lead	38	M	J
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	MN	Manganese	477		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	HGC1	HG	Mercury	2.4		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	VMS1	CH2CL2	Methylene chloride	0.0019	JP	J
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	NI	Nickel	97.5		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	VMS1	MEC6H5	Toluene	0.002	JP	J
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	9060	TOC	Total organic carbon	7630		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	V	Vanadium	22.5		
CPG	CSO	SURF	SS0161PGDS	0.0	5/2/96	ICP1	ZN	Zinc	2220	M	J

Table 3.15-1
Detected Target Parameters in Surface Soil
Central Proving Grounds
Louisiana Army Ammunition Plant
Doyline, Louisiana

Area	Media Type	Site Type	Site ID	Depth (feet)	Sample Date	Method	Test Name	Parameter	Value (µg/g)	Flag Code	Data Qualifier
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	VMS1	ACET	Acetone	0.0058	JP	J
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	AL	Aluminum	16900		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICM1	SB	Antimony	0.499		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICM1	AS	Arsenic	0.875	JP	J
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	BA	Barium	77.8		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICM1	BE	Beryllium	0.365		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICM1	CD	Cadmium	1.75		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	CR	Chromium	23.1		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	CO	Cobalt	5.61	JP	J
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	CU	Copper	643		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	SMV2	DNBP	Di-N-butyl phthalate	0.042	JP	J
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	FE	Iron	17100		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	GPB1	PB	Lead	46	M	J
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	MN	Manganese	361		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	HGC1	HG	Mercury	85		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	NI	Nickel	18.8		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	VMS1	MEC6H5	Toluene	0.0013	JP	J
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	9060	TOC	Total organic carbon	5710		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	V	Vanadium	28.8		
CPG	CSO	SURF	SS0162PGDS	0.0	5/2/96	ICP1	ZN	Zinc	408	M	J
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	AL	Aluminum	8270		
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICM1	SB	Antimony	0.0725	JP	J
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICM1	AS	Arsenic	0.537	JP	J
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	BA	Barium	55.8		
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICM1	BE	Beryllium	0.205	JP	J
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICM1	CD	Cadmium	0.971		
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	CR	Chromium	15.6		
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	CO	Cobalt	4.99	JP	J
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	CU	Copper	190		

Table 3.15-1
Detected Target Parameters in Surface Soil
Central Proving Grounds
Louisiana Army Ammunition Plant
Doyline, Louisiana

Area	Media Type	Site Type	Site ID	Depth (feet)	Sample Date	Method	Test Name	Parameter	Value (µg/g)	Flag Code	Data Qualifier
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	FE	Iron	9110		
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	GPB1	PB	Lead	23	M	J
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	MN	Manganese	217		
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	HGC1	HG	Mercury	18		
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	NI	Nickel	4.82	JP	J
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	VMS1	MEC6H5	Toluene	0.0015	JP	J
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	V	Vanadium	19.6		
CPG	CSO	SURF	SS0163PGDS	0.0	5/2/96	ICP1	ZN	Zinc	310	M	J

Notes:

µg/g = micrograms per gram

Flag Codes:

D - Duplicate sample

J - Value is estimated

M - The spike recovery is outside acceptance criteria

P - Results less than reporting level but greater than instrumental detection limit

Data Qualifiers:

J - Value is estimated